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P A P E R S
IN
A G R I C U L T U R E.

A G R I C U L T U R E.

THE Thanks of the Society were this Session voted to NATHANIEL KENT, Esq. for the following Communication; and he was desired to make the due acknowledgments of the Society to HIS MAJESTY, for having been graciously pleased to permit so full and exact an Account of the Improvements on the Farm in the Great-Park, at Windsor, to be transmitted to the Society, whereby so much benefit is likely to accrue to the Public.

S I R,

UPON mentioning to you some time since, that there had been some practices in Husbandry, on his Majesty's Farms under my superintendance in Wind-

for Great Park, which I conceived were not generally known ; and upon your giving me reason to think the Society for the Encouragement of Arts, &c. from its laudable desire to communicate to the Public every thing that promises advantage to it, would not be unwilling to allow me a few pages in its next publication ; and being indulged with His Majesty's gracious permission, to state any matter that I may discretionally judge proper to communicate ; I am induced to lay before you a few particulars, which some Gentlemen and Farmers, under similar circumstances, may perhaps think deserving notice.

But before I enter upon any particular description of what I have to offer, it will not, perhaps, be uninteresting to the Society, to know the grounds upon which His Majesty's large system of Agriculture has been founded.

In the year 1791, the Great Park at Windsor, about 4000 acres, fell into His Majesty's possession. It might truly be
called

called a rough jewel. The whole, as a natural object, was grand and beautiful, of a forest appearance; but the parts were crowded and indistinct. The soil was various, some parts clay and loam, and some sharp gravel or poor sand; a great part of the former was covered with rushes and mole-hills, and the latter with fern and moss.

About 1000 acres of the lightest part were separated from the rest at one extremity, and formed what is called the Norfolk Farm: about 400 acres more, at the other extremity, of a good loamy soil, were separated, and called the Flemish Farm, both being named from the nature of the husbandry meant to be adopted upon them.

The rest (about 2,400 acres) remains still in Plantations and Park; and though so much reduced, yet, from the improvements which have been made upon it, is now capable of carrying more stock than the whole 4000 acres did before. All the unsound wet parts have been drained by the Essex mode, so as to be rendered firm,
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and productive of an improved herbage. The mole-hills have been levelled, chiefly by dragging, and the coarse and mossy parts fined by repeated harrowing and rolling, (being one of the first improvements upon Park Land of this description); besides which, a variety of beauty has been laid open, by clearing the valleys and low parts, to give a bolder effect to the woody scenes upon the higher ground; and by making judicious openings, so as to break strait lines, and separate parts that were in some places too heavy and samely: so that the same extent of land has now not only a much larger appearance, but exhibits a much greater variety of ground. The truth of this, every impartial person who knew the place before His Majesty caused these improvements to be made, must allow. I have only to add, that though prejudice may have taken up an idea that there has been too great a sacrifice of timber in effecting these improvements, truth will deny it. There has not been a tree taken down,
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but what was either in decay, or removed either to give room for the growth of others, or to set them off to greater advantage in picturesque appearance.

I come now to the object in view, as before hinted, which is to state the motives which I am inclined to think induced His Majesty to adopt the farming system upon so large a scale, and next to shew the result.—These I conceive were chiefly to create useful labour for the industrious poor in the neighbourhood, and for trying experiments in Agriculture, to excite imitation where success might encourage it.

The Norfolk Farm borders on that extensive waste called Bagshot-heath, hitherto considered too barren for cultivation, though large tracts of a similar quality have been long since rendered useful to the community in the south-west part of Norfolk. Arable land of this description is generally managed there under a five-course shift; first, wheat; second, turneps; third, barley with seeds, which continue laid two years.

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But as the seeds turn to very little account after the first year, His Majesty's, which though a five-course shift likewise, of one hundred acres in a shift, is upon a much improved course of cropping; as thus—first, wheat or rye; second, the irregular shift; third, turneps; fourth, barley or oats; fifth, clover.—The irregular shift, which is of great use on a light land farm, may perhaps want a little explanation. It is meant to be partly productive, and partly preparative. Forty acres of it are sown with vetches, to be fed off; forty are sown the latter end of August with rye, for early feed the next spring for the ewes and lambs; the remaining twenty acres are planted with potatoes, and the whole comes round for turneps the next year.

From the advantage of running sheep in the Park, this Farm has been brought surprisingly forward, considering the short time it has been cultivated; and a great part of it, which produced nothing but heath and moss, and would have been dear

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at five shillings an acre to rent, now produces crops worth more than the original fee-simple of the land.

Brevity checks me from going farther into a general description ; but the following particulars may deserve notice.

The comparative advantages of the labour of Horses and Oxen have been for some time under the consideration of the Public. His Majesty has unquestionably tried the latter upon a larger scale than any other person, as he does not work less than one hundred and eighty Oxen upon his different farms, parks, and gardens, and has found them to answer so well, that there is not now a horse kept.—Upon the two Farms, and the Great Park, two hundred are kept, including those coming on and going off. Forty are bought in every year, rising three years, and are kept as succession oxen in the Park ; one hundred and twenty are under work ; and forty every year are fatted off, rising seven years.

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The working Oxen are mostly divided into teams of six, and one of the number is every day rested, so that no ox works more than five days out of the seven.—This day of ease in every week, besides Sunday, is of great advantage to the animal, as he is found to do better with ordinary keep and moderate labour, than he would do with high keep and harder labour. In short, this is the first secret to learn concerning him; for an ox will not admit of being kept in condition like a horse, artificially, by proportionate food to proportionate labour.

These Oxen are never allowed any corn, as it would prevent their fattening so kindly afterwards. Their food in summer is only a few vetches, by way of a bait, and the run of coarse meadows, or what are called leafows, being rough woody pastures. In winter they have nothing but cut food, consisting of two thirds hay, and one third wheat-straw; and the quantity they eat in twenty-four hours is about twenty-four pounds of hay and twelve of straw: and on
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the days of rest, they range as they like in the straw-yards ; for it is to be observed, that they are not confined to hot stables, but have open sheds, under which they eat their cut provender, and are generally left to their choice to go in and out. Under this management, as four oxen generally plough an acre a day, and do other work in proportion, there can be no doubt but their advantage is very great over horses, and the result to the public highly beneficial.

The Oxen which are brought on in succession, run the first summer in the Park, and in the leasows and temporary straw-yards in the winter ; by which temporary straw-yards, I would have it understood, that they are made in different places, so that the manure which they make may be as near to the spot where it is wanted as possible.

The forty Oxen which go off are summered in the best pasture, and finished with turneps the ensuing winter.—The usual way has been to draw the turneps, and to give

give them either stalled or in cribs placed in the yard, with plenty of straw to browse and lie upon : but last winter an experiment was tried, which answered extremely well, and will be again repeated next winter : this was, penning the oxen by day upon the turnep-land, in the manner that sheep are penned, with this only difference, that the turneps were thrown up into cribs, instead of being left to be trodden into the ground ; and in the nights they were driven into a yard, with a temporary shed well littered with rushes, fern, and leaves, and turneps and barley-straw given to them in cribs. They thrived very fast, and every one of them made at least eight loads of good muck in the night-yard, besides the benefit done in treading and dunging on the land in the day-time, which was very great, the soil being very light.—The result of the Ox system is, that charging the ox for his agistment the first year, for the value of the grass and turneps the last year, and putting what he has in three intermediate

mediate years as an equivalent for his labour, after every allowance for risk, each Ox will pay at least twenty per cent. profit.—In what instance does a horse produce so much?

I do not allow that the Ox can be used on all soils; upon a very stony soil he cannot: nor can the horse in all places be wholly excluded from Husbandry; but every occupier of a large farm may at least use some Oxen to very great advantage. They are all worked at Windsor in collars, as their step is found to be much more free than when coupled together with yokes; and they are found to do their work with much greater ease in collars than in yokes, which ought every where to be exploded.

The different kinds of Oxen are in some measure suited to the soil.—Upon the Norfolk Farm, which is a light soil, the Devonshire sort are used; upon the Flemish Farm, where the soil is strong and heavy, the Herefordshire; and in the Park, where the business is carting, harrowing, and

K rolling,

rolling, the Glamorganshire.—They are all excellent in their different stations.

It may not be improper to mention a very simple method which has been discovered, of first training them to the collar, which is nothing more than putting a broad strap round their necks, and fastening one end of a cord to it, and the other to a large log of wood, and letting the Ox draw it about as he feeds in his pasture, for three or four days, before he is put into harness, by which means he is very much brought forward in docility.

I have before observed, that twenty per cent. may be considered as the average profit of an Ox; stating them to be bought in at £.10, and allowing them to sell for £.25, taking off £.10 for the two years they are not worked: but last year beans being of very little value, they were kept longer than usual, by being stall-fed with bean-meal, which answered very well, as they were brought to an average of nearly £.30; and one of them, a Glamorganshire

morganfhire Ox, originally bought for £.8, and, from his compact round make, always called the Little Ox, thrived to fuch a furprifing degree, that he became too fat to be able to travel to Smithfield, and was therefore fold to Mr. Charlwood, a neighbouring butcher, for £.47.

Next to the advantage obtained from oxen, as much benefit as poffible has been endeavoured to be derived from fheep, by means of the fold.—Two ewe flocks are kept, of four hundred each: the foil being light and dry, admits of winter-folding (except when the weather is wet), upon the young clover;—a praftice much to be recommended, as it is productive of a great crop of clover, and prepares the land the enfuing autumn for a crop of wheat, without any further affiftance. Another excellent praftice is folding upon light land, in dry weather, immediately upon the fowing of the wheat, which may be put forward, or kept back, a fortnight or three weeks, on that account; and it is not amifs

to have the fold rather large, and to give the sheep a turn or two round the fold in a morning before they are let out, to tread and settle the land, which does a great deal of good, over and above their dung.

A third method of folding has been found to answer almost beyond description. This was first tried in the winter of 1793; but from an idea of the shepherd, that it injured the sheep, has been since disused: but as there is good reason to believe that there was no just ground for such an opinion, it is meant to be revived next winter.

A dry sheltered spot is selected, and fods of maiden earth, a foot deep, are laid over the space of a very large fold. It is then bedded thinly with rushes, leaves of trees, fern, moss, short straw, or stubble; and in hard or wet weather, the flock, instead of being penned upon the clover in the open fields, is put into this warmer fold, where the usual quantity of hay is given to them in racks; and every night they are so penned, the fold is fresh littered. When this has
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been continued, at intervals, during the winter, a layer of lime, chalk, rubble, or ashes, six inches thick, is spread over the whole surface—and when it has heated together, about the month of April, the whole is turned up, and mixed together, and makes the very best manure that can be used for turneps.

I have been particular in describing these methods of folding, as they are not common in any place, and in others entirely unknown, and to Gentlemen who have parks and large plantations which afford abundance of leaves, this hint may be the more deserving attention.

Upon the Norfolk Farm the land not having been yet marled or clayed, the clover is apt sometimes to fail, which is also the case elsewhere, upon the same sort of land. When this happens, His Majesty does what every other person in a similar situation should do; instead of letting the ground remain unproductive, the next year it is sowed with vetches, which are nearly

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as valuable as the clover, and wheat always grows remarkably kind after them.

As to implements, the Norfolk plough is chiefly what is used; and upon a light soil, it is certainly preferable to any other. It ploughs a cleaner furrow, by completely moving the whole body of earth, and inverts it much better than any other plough; and to establish its superiority over the common ploughs of the neighbourhood, I need only add, that from its construction it is nearly the draught of an ox easier. There is likewise a Norfolk harrow, very useful for harrowing what are called brush-turneps, or any other turneps, preparatory to their being hoed.—I must be allowed, likewise, to mention the drill-roller, which consists of cast-iron rings, made at the Norwich Foundry, and slipped on upon a round piece of wood, as an axle-tree. This is one of the best things that has ever been introduced, for the preparation of the land for any sort of corn, where the soil will admit of its being used.

By

By the corn being so well deposited, it takes better root, and at least one fourth of the quantity usually sown may be saved.

The Flemish Farm, which I have before mentioned, was so named from an intention, at first, of carrying on a system of husbandry similar to that practised in Flanders, which consists of an alternate crop for man and beast; but the soil being strong and cohesive, upon trial, it has been found to answer best under a four-course shift, more like some parts of Gloucestershire; as thus—first year, wheat; second, cabbage or clover; third, oats; fourth, beans.—The quantity of arable land on this Farm is one hundred and sixty acres, or forty acres in a shift. There are two things observed upon this Farm, which may be worth notice:—The first is the practice which has for these two years past been adopted, by taking off the tops of the beans just as the blossom is set; this not only improves the quality, but increases the quantity, and causes them to ripen sooner, which is a

considerable advantage, by giving time to get the succeeding crop of wheat in perhaps a fortnight earlier. The other is, that of sowing clover early in the spring, among twenty acres or one half of the wheat, and bush-harrowing and rolling it in. This has produced a very fair crop of clover the next year; and the other half, after the wheat, is winter and spring fallowed, and planted with cabbage. There is a double advantage resulting from this; that one half of this shift, so managed, becomes a summer crop, and the other half a winter crop; and by observing the next year to change the parts, by sowing the clover where the cabbage was before, the clover and cabbage do not come round upon the same ground but one in eight years.

Cabbage has been tried several years, but His Majesty's husbandmen never got into the right management of it till this year; but now the crop is remarkably fine.

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It will not be improper to mention, that the drum-headed cabbage is the best sort; that the seed should be sown in August, the plants first set out in November, and transplanted for good in July. The next thing to be noted is their application:— They are certainly inferior to turneps for fattening, but superior in the increase of milk, either of cows or ewes, and therefore they are particularly good where there is a dairy or a breeding flock of sheep: and I trust His Majesty will, the next yearling season, try an experiment, of which I have high expectation, which is to slice or quarter the cabbage, and feed the ewes with them upon such of the meadows as want manuring, which I flatter myself will be of inestimable service to the ewes and lambs, and be the means of increasing the next years crop of hay considerably.

The true light of viewing these improvements is to consider them as a sort of new creation to the public; for, as it is a fact not to be controverted, that the reduced

duced number of acres in the Park, from their improved state, support as many deer and other cattle as the whole did before, the produce obtained from the Farms is all clear gain; and as the crop of wheat and rye from the 140 acres sown, upon the most moderate calculation, may be set at 3,360 bushels, and allowing six bushels to a human mouth, this gives a yearly provision in bread for 560 people; to say nothing of the fatting-off of forty oxen, the breed of 800 sheep, and the growth of at least 5000 bushels of oats and beans; all of which, it must be observed, goes in aid of the public market, as the work is done by Oxen entirely.

As more experiments are in future made, I may perhaps trouble the Society with an account of them, as I am persuaded they cannot be registered any where else, to give them the credit, and to excite the imitation I flatter myself they may deserve: but for the present, I shall close my observations upon His Majesty's Farms, with a description

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tion of his Mill, which I consider as the most benevolent thing that can be done for the Poor, and which I most earnestly recommend to all Gentlemen of landed property, who have like means of doing it. A small Over-shot Mill is erected, and worked by the waste water from the lake below the Lodge, where a sufficiency of corn, two thirds wheat and one third rye, is ground, dressed, and given to all the labourers, at sixteen pence per stone of fourteen pounds, in quantities suitable to the size of their families, which is the first of all comforts to them, and a saving of at least twenty per cent. from what it would cost them to buy it from the mealmen or shopkeepers.

I am, SIR,

Your obedient humble servant,

NATHANIEL KENT.

*Craig's Court,
30th October, 1798.*

Mr. MORE.

The

The GOLD MEDAL, or THIRTY GUINEAS, at the option of the Candidate, being the Premium offered for PLANTING OZIERs, was this Session adjudged to THOMAS PAGE, of Ely, Esq. from whom the following Accounts and Certificate were received, and who made choice of the Honorary Reward.

SIR,

SEEING in the yearly publication of the Society for the Encouragement of Arts, Manufactures, and Commerce, an account of the Premiums offered by the Society to the person who shall plant the greatest number of acres with Oziers in the year 1798, I beg leave to inform the Society what I have done this year. In the months of March and April last, I planted seven acres and a half of the various Oziers fit for the purpose of basket-making, consisting of the Ozier, Spaniard, New-kind, and

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and a great deal of what is called in this part of the country the last *new kind*, not less than thirteen thousand to the acre, and on some acres considerably more than fourteen thousand.

For my Certificate of their planting, and that they are in a thriving state, I beg leave to refer you to John Phillips, Esq. of Ely, of whom I had the sets, and partly under whose direction and advice, he having practised a great deal, I did the planting.

Should the Society deem that what I have done entitles me to their Honorary Reward, I shall think myself highly flattered by such a mark of their approbation.

I am, SIR,

Your most obedient servant,

THOMAS PAGE.

Ely,

Nov. 15th, 1798.

Mr. MORE.

I JOHN PHILLIPS, of Ely, Member of the Society instituted at London for the Encouragement of Arts, Manufactures, and Commerce, do certify, that the account given by Thomas Page, Esq. and herewith transmitted to you, of the Ozier Plantations made by him in the months of March and April last, is true. The sets were furnished by me, because the other Planters either had not or would not part with any of the best sorts. About four acres were planted with the two sorts of New-kind and West-country Spaniard; and the remainder with the common Spaniard, the Red Welch, and four or five varieties of the common Ozier. They are well guarded by sufficiently wide and deep ditches, and have been kept very clean from weeds. They are not vigorous, but they are as flourishing as any that I have seen this year. All the young Plantations have suffered much by what is commonly called the *blight*, but which is none other than a small brown fly, that feeds upon

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upon the opening bud, and whose young, generated between the bud and the bark, afterwards devour the leaves and shoots. Mr. Page has spared neither trouble nor expence in their proper care and management; and if the soil, which is a black peat, is sufficiently strong to carry them, I have no doubt but they will recover from the ravages of the fly, by the aid of a copious supply of water next summer, for which he has made provision, by laying a tunnel to convey it from the river to the plantations.

Ely,
Nov. 25th, 1798.

SAMUEL MORE, Esq.

TWENTY GUINEAS, being the Premium offered for the Culture of **BEANS** and **WHEAT**, was this Session adjudged to **Mr. ROBERT DUDGEON**, of Tynningham, from whom the following Papers were received.

SIR,

HAVING been in the practice of sowing Wheat after drilled Beans, I take the liberty of laying before the Society for the Encouragement of Arts, Manufactures, and Commerce, an account of three fields, containing nearly twenty-three and a half acres (English statute measure), drilled with Beans in the spring of 1797, and sown with Wheat the same year.

One hundred and twenty-six bushels of Tick Beans were sown, which, at an average, is five bushels one peck and a half of seed per acre. The total produce was one hundred and thirteen quarters, five bushels,

bushels, and three pecks; that is, thirty-eight bushels, three pecks, per acre, average produce.

The field marked N^o 1 in the surveyor's certificate, containing 8.26. acres, is part strong red clay, upon a limestone bottom, and part a mixed soil of clay and loam, upon the same bottom; but the soil is of a greater depth. This field was twice ploughed. The first furrow was given in October, 1796. In February, 1797, it was dunged at the rate of sixteen cart-loads per acre (containing from fourteen to sixteen hundred weight each), and immediately got a second ploughing, the beans being drilled into the bottom of the furrow, behind the plough. Two acres and a half were drilled at the distance of every third furrow, making an interval of twenty-four inches between the rows; but this being too wide, the remaining part of the field was drilled at the distance of two furrows, making eighteen inches width between the rows. The same quantity of

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feed

feed per acre, viz. five bushels and three pecks, was sown in both cases; and at harvest, no apparent difference could be observed in the crop. The beans were drilled on the 27th and 28th of February, and the 1st of March, and the field completely harrowed. Some days afterwards, having had a frost, which made the soil crumble and fall, it was harrowed a second time, to reduce the mould to as fine a state as possible.—This field was reaped on the 6th, 7th, and 8th of October; and once ploughed and sown with wheat on the 10th and 11th of November, 1797. The produce of beans was forty-seven quarters, or forty-five bushels two pecks per acre.

The field N^o 2, containing 10.88. acres, is part clay, the same as N^o 1, upon a limestone bottom, at a considerable depth, and part a light deep gravelly soil, with a subsoil of red clay. It was twice ploughed, first in October, 1796, and lastly in February, 1797, immediately after which it was formed into ribs of twenty inches

inches width, by making the horse on the left-hand side of the plough* go in the last drawn furrow. The beans were drilled between these ribs on the 2d, 3d, and 11th of March, and covered by harrowing first along the drills, and then across with a common harrow, till the surface was perfectly flat and the mould fine, the beans being left at a depth of four inches.—The quantity of seed per acre was five bushels. This field was reaped on the 4th, 5th, and 6th of October; dunged on the bean stubble, at the rate of fifteen cart-loads per acre; once ploughed, and sown with wheat, on the 13th, 14th, and 22d of November, and the 21st of December, 1797. The produce of beans was fifty-one quarters, four bushels, or thirty-seven bushels, two pecks, per acre.

The field N^o 3, containing 4.22. acres, is a light gravelly soil, upon a subsoil

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* In this county, we plough with two horses only, which are yoked abreast, and go without a driver.

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of sand mixed with small gravel. It was twice ploughed, first in October, 1796, and lastly in February, 1797. It was afterwards ribbed in the same manner as N° 2, and the beans drilled on the 16th and 17th of March, at the rate of five bushels two pecks per acre, and covered by harrowing the same as N° 2. This field was reaped on the 21st of September, and one half of it ploughed. It was then dunged at the rate of eighteen cart-loads per acre, and the whole field ploughed over, and sown with wheat on the 28th of December, 1797. But the crop of wheat upon that part of the field which got two furrows, was much inferior to that where it got only one; which shews the impropriety of loosening soils of this quality by repeated ploughing, particularly where the subsoil is so little calculated for the retention of moisture. The produce of beans upon this field was fifteen quarters one bushel, or twenty-eight bushels two pecks, per acre.

Remark.

Remark.—The superior produce of field N° 1, is not to be attributed to its being drilled in a different manner from N° 2 and 3, but to its being dunged previous to the bean crop, and to the frost happening so opportunely after drilling for getting the mould brought to a fine state. Indeed, the mode of drilling pursued in this field, is what I never practice, but where local circumstances prevent the other from being adopted: for, if the furrows are taken so as to stir the soil to a proper depth, the seed is then laid at too great a distance from the surface; in which case it generally sends up a weak plant. And if such a furrow is only taken as will place the seed at a proper depth, the bottom soil is then left unstirred, whereby the pasture of the plant is greatly circumscribed. The tap root may indeed penetrate the substratum, but the small lateral fibres are prevented from spreading as they ought to do.

The drill employed was the common hand-drill used in this county, which

is pushed along by two handles, like a wheelbarrow, and sows one row at a time. The wheel is about twenty-two inches diameter, of solid deal, upon the axle of which is also fixed a notched roller of two inches and three quarters diameter, and two inches long, which turns in the fore part of the drill-box.—The quantity of seed is regulated by a slider, which moves up and down in the fore part of the box, by an adjusting screw fixed at top; the slider having a strong brush projecting from its lower end, which sweeps upon the notched roller. There is also a sluice or slider that lies flat upon the bottom on the inside of the drill-box. This slide projects between the two handles of the drill, so as to be within reach of the person that guides it; who, by pushing the slide forward, completely covers the notched roller, and prevents any of the beans getting out while the drill is turning at the end of the ridges. A woman or boy will drill from two to two acres and a half per day, when the rows are at twenty inches distance.

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All the fields were harrowed into a fine mould after sowing; and when the beans had got above the ground, and the first leaves were fairly opened and green, they were again harrowed with a common harrow, which destroyed a crop of annual weeds, and saved a great deal of hand-weeding. The bean, at this stage of its growth, is possessed of a toughness that prevents it from receiving any injury by the harrow, provided the land has been previously brought to a fine mould, and the operation performed in dry weather. But if the surface is rough, the young plants are in danger of being covered by the clods; and if the harrowing is given at an earlier period, before the leaf has acquired a green colour, the bean is then in so tender a state as to be broken and destroyed by the harrow.

Horse-boeing.—The intervals were horse-hoed at the proper season with a small plough, which is so constructed as to prevent any of the mould falling to the left-

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hand side. This plough was run close alongside of one row, by which the mould was turned over to the root of the next. The whole having been gone over in this way, making one furrow in each interval, the fields were allowed to lie in that state for a week, in order to give the weeds time to wither. The hoeing was then reversed, and the mould turned back again to the other side, which completely destroyed every weed between the rows.

Expence of Cultivation, per Acre.

		s.	d.
Each ploughing,	-	5	3 per acre.
Ribbing,	-	3	2 ditto.
Sowing,	-	3	2 ditto.
Covering the seed,		1	8 ditto.
Harrowing to kill	}	1	0 ditto.
weeds,			
Horse-hoeing,	-	3	0 ditto.
Hand-weeding,	-	2	4 ditto.

Application

Application of the Straw.—The bean straw was used as fodder for the working horses in winter ; for which purpose it is fully equal to pea straw, commonly used in this part of the country ; and when it is well got, the horses are fonder of it than they are of pea straw.

The seed-wheat, sown after the twenty-three acres and a half of drilled beans before mentioned, was raised by me from a single grain ; the produce of which, viz. five hundred and forty grains, I planted in the spring of 1793. In the spring of 1794 I planted the returned produce upon a clover lay, after once ploughing, in rows twelve inches wide, and four inches between the plants, two grains being put into each hole ; but from being planted in the spring, and a great drought following, the return was very small. This produce was sown broadcast, in the ordinary way, and produced, in 1795, twelve bushels three pecks. This was likewise sown in the same manner, and produced, in 1796, fifteen quarters ; which
being

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being also sown broad-cast, produced, in 1797, more than I had occasion to use as seed that season.

I have for some time practised the raising of my feed-corn from the produce of a single grain, picked while growing in the field, and find it a considerable improvement, as it equalizes the period of ripening, and produces a better sample at market, the grain being all nearly of a size.

As the Society wish for accounts of wheat sown after drilled beans, I take the liberty of stating (in addition to the above) the following crops, which I have raised in that rotation.

In 1792 I drilled forty-six acres with beans from the 14th to the 28th of March, the land being all ribbed at twenty inches wide, after being most of it twice ploughed; the crop was reaped from the 22d of September to the 16th of October, but the extreme wetness of the season prevented the beans being cleaned off the land till the 10th of November, which was sown with
wheat

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wheat from the 18th of February to the 14th of March, 1793.

In 1793 I drilled sixteen acres and a quarter with beans; in 1794, twenty-six acres and a quarter; in 1795, twenty-one acres and a quarter; and in 1796, three acres, all which were followed by wheat in their respective years. And the bean-straw of these several crops was uniformly applied as fodder for the working horses.

As the early season at which beans are generally sown, prevents the soil from being so well prepared as for the later sown spring grains,—in order to ascertain how late they would admit of being sown, I drilled a bushel so late as the 19th of April in 1792. The crop was reaped on the 16th of October, and produced twelve bushels two pecks; but the grain was of an inferior quality.

We have a species of pea in this county, which admits of being sown so late as the month of May, and ripens at the usual season. If a bean with the same properties could be procured, it would be a most desirable

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desirable acquisition ; as the land would be so completely prepared before the time of sowing, that with proper horse-hoeing the bean fields would be as clean and fit for wheat as a complete summer fallow.

The procuring a species of bean possessing such qualities, would be an enquiry not unworthy of a Society so eminent for their patriotic exertions in the improvement of the country.

Hoping the Society will excuse the freedom I have used, in taking up so much of their time with these additional statements,

I am, SIR,

Your very humble servant,

A PRACTICAL FARMER.

Mr. MORE.

THIS is to certify, That I have measured the under-mentioned fields, belonging to Robert Dudgeon, Farmer, in Tynningham, in the parish of Whitekirk, and county of Haddington, and find the contents of each to be as follows, viz.

N^o 1.

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N ^o 1. Chalk Park	- -	8.26 acres
2. Draper's ditto	- -	10.88
3. Redhugh Brae Park		4.22

Amount in English measure 23.36 acres

The above measure includes only the arable part of each field.

To my certain knowledge these fields were in drilled beans crop 1797, and sown with wheat the same year.

WILLIAM DICKINSON,
Land-Surveyor.

WE, George Meickle, Farmer, in the Knows Milln, and W. Hunter, Farmer, of Knows, parish of Whitekirk, do hereby certify, that Mr. Robert Dudgeon, Farmer, of Tynningham, in the parish of Whitekirk and county of Haddington, drilled in the month of March, 1797, twenty-three acres and a half nearly

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nearly of land with beans, and sowed the same with wheat the end of the same year, 1797.

As witnesses our hands, this 18th day of October, 1798,

GEORGE MEICKLE,
WILLIAM HUNTER.

SIR,

THE within certify my having drilled twenty-three acres and a half of land with beans, in three fields, in 1797, and sowed the same with wheat the end of the same year, as stated in the account accompanying this, marked “An Account of twenty-three acres and a half of land drilled with beans in 1797, and sowed with wheat the same year.”

I am, SIR,

Your humble servant,

ROBERT DUDGEON,
Farmer, Tynningham, near Dunbar.

Mr. MORE.

SIR,

I WAS favoured with yours of the 21st, wishing to be informed if I had subscribed as witness to a certificate of Mr. Robert Dudgeon, of Tynningham, near Dunbar. In answer to which, I did subscribe to a certificate of Mr. Robert Dudgeon having sown twenty-three acres thirty-six hundred parts of one acre with beans, in the year 1797, and having sown the same land with wheat in the same year.

Your most humble servant,

GEORGE MEICKLE.

Knows Mill,
Nov. 24, 1798.

Mr. MORE.

The

THE GOLD MEDAL OF THIRTY GUINEAS, being the Premium offered for POTATOES for feeding CATTLE and SHEEP, was this Session adjudged to Mr. WILLIAM SEATON, from whom the following Account and Certificate were received. Mr. Seaton made choice of the Pecuniary Reward.

An Account of the Expence of cultivating six acres of Land for, and planting the same with, Potatoes, and of the produce and value thereof for feeding Cattle, by Mr. William Seaton, of Tilgate, in the parish of Worth, in the county of Suffex, and for which he begs to lay in his claim for the Premium offered by the Society for the Encouragement of Arts, Manufactures, and Commerce.

THE land had been lately inclosed from a rabbit-warren, called Tilgate Forest, near Crawley in Suffex, which was denshired, and one crop of oats taken from it; but the crop was so indifferent, that

that the land was thought not to be worth the expence of cultivation, and, on that account, was again thrown open to the warren, and fed upon by the rabbits for two years. In October, 1796, it was again inclosed and ploughed up. It lay fallow till the middle of March, 1797; it was then harrowed, and in a few days afterwards cross-ploughed. It remained in that state till the first week in April, when it was again harrowed, and in a few days afterwards ploughed a third time; and in about ten days more, it was harrowed a third time, and laid up in ridges for the reception of dung. Twelve cart-loads of very indifferent fold yard dung (not worth more than two shillings per load), were then laid upon it; and before the 25th of April twenty bushels per acre of potatoes, of a mixed kind, were planted upon it. In the month of June the land was once hoed, and the potatoes earthed up.—In October the potatoes were taken up by the plough, and produced rather more than two hundred and

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fifty bushels per acre. This crop was applied as follows :

Feeding one cow, from the 1st of December, 1797, to the 15th of March, 1798, when the cow was killed, for the use of William Seaton's family; she was not worth more than £.8 when put up to fatten, but fattened remarkably kindly, and when killed was well worth £.20. It also supported well eight store pigs of four months old, one two-year old bull, sixteen yearly calves, one cow and calf, and three milch cows (who ate at least half a bushel each per day), from the 1st of November to the 1st of April, and three heifers in calf from the 13th of February to the 10th of April. The remaining two hundred and eighty bushels were kept for seed, and planted upon fourteen acres of warren land, *without dung* (of which an account will be given to the Society next year). The expence of raising, and the application of this crop on the six acres of land, are as follow.

<i>Expences.</i>			<i>Value of Produce.</i>		
	£.	s. d.		£.	s. d.
Three ploughings, at 3s. per acre each time, the ground being light	2	14 0	Fatting one cow 105 days, at least 2 bushels per day, well worth	10	10 0
Three harrowings, at 1s. per acre	0	18 0	N.B. She improved 12l. at least		
Ridging up and covering the potatoes, 4s. per acre	1	4 0	Feeding 8 store-pigs 21 weeks, at 1s. per week each	8	8 0
Dung, 12 cart-loads per acre, at 2s. each	7	4 0	Ditto one 2-years old bull, at 3s. per week	3	3 0
Carting and spreading, 1s. per acre	3	12 0	Ditto 16 yearly calves, at 1s. 6d. each per week	25	4 0
Potatoes, 20 bushels per acre, at 1s.	6	0 0	Ditto 1 cow and calf, at 3s. 6d. per week	3	13 6
Cutting potatoes, 1d. per bushel	0	10 0	Ditto 3 heifers in calf, at 3s. per week each	3	12 0
Setting, 2s. per acre	0	12 0	226 bushels given to three milch-cows in 151 days, being half a bushel per day each, at 1s. per bushel	11	6 0
Hoeing, 2s. per acre	0	12 0	280 bushels reserved for feed	14	0 0
Earthing-up, 2s. per acre	0	12 0			
Taking up and securing, 1s. per acre	6	0 0			
Rent and Taxes, 6s. per acre	1	16 0			
	£. 31	14 0		£. 79	16 6

I, THE above-named William Seaton, do hereby certify and declare, that the facts above stated are, to the best of my knowledge and belief, just and true; as witness my hand, this 8th day of November, 1798.

WILLIAM SEATON.

I, JAMES BUNN, of Staplefield Place, in the county of Suffex, do certify, that I am well acquainted with the above William Seaton, that he is a man of veracity, and that I verily believe the account above stated by him to be true; as witness my hand, this 8th day of November, 1798.

JAMES BUNN.

I, WILLIAM LAMBE, of the Middle-Temple, London, Esq. do hereby certify, that the above-named William Seaton is tenant to me of the land above-mentioned; that the facts above stated were by him reduced into writing in my presence,

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fence, and upon the spot ; and that, upon inspection and enquiry, I verily believe the same to be true ; as witness my hand, this 10th day of November, 1798.

WILLIAM LAMBE.

No. 4, Pump-Court, Temple.

Mr. MORE.

THE GOLD MEDAL, or the SILVER MEDAL and TWENTY GUINEAS, at the option of the Candidate, being the first Premium offered for IMPROVING LAND LYING WASTE OR UNCULTIVATED, was this Session adjudged to Mr. ROBERT BELL, of Huntshill, near Jedburgh, North Britain; but Mr. Bell dying before the distribution of the Rewards, his Son and Heir, made choice of the SILVER MEDAL and TWENTY GUINEAS.

S I R,

I ADDRESS this letter from the borders of Scotland, where ancient contention in the rivalry of arms has given place to a spirit of emulation in the arts of peace. The animosity of our ancestors, which so frequently wrapped this part of our happy Isle in the flames and destruction of war, has subsided: industry, mutual esteem, and reciprocal good offices, have succeeded; and the sheep crook and fertilizing plough
are

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are the only implements which occupy the hands and attention of our prosperous community. Those improvements in the Arts which were first introduced into the Sister-Kingdom are successfully practised here; and such in particular as are connected with the rural economy have been already carried to a great degree of perfection. Their further progress is also encouraged by praiseworthy, patriotic institutions; though by none of such great and extensive utility as that of the Society for the encouragement of Arts, Manufactures, and Commerce.

Having some months ago seen the list of premiums offered by this laudable Institution, my attention was naturally directed to that class of them intended for the encouragement of agriculture. I had farmed to a considerable extent for more than thirty years; and having acquired experience in the cultivation of land, it was impossible I should overlook a plan which seemed so eminently calculated to promote the improvement of this useful art. My attention
once

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once excited, I resolved to contribute my mite in furtherance of the patriotic views of the Society, by giving an account of the improvement of an extensive farm, containing a large portion of land lying waste and uncultivated, in which I have been engaged for these eight years past.

Previous to commencing this intended labour, however, in compliance with the direction contained in the published notice, I procured and carefully read over the last Volume of the Society's Transactions. The perusal of this work could not fail to inspire me with a just respect and esteem for so honourable and useful a Society. I have paid every attention to the spirit of the premium offered for the improvement of waste land; I trust that I have not so far misunderstood it, as to be liable to be accused in the paper which accompanies this letter, of too great a degree of conciseness on the one hand, or of unnecessary prolixity on the other. The lateness of the arrival of this Volume greatly retarded the commencement

mencement of the account of my improvements; so that I have much to regret on account of the shortness of the period which I have had for its relation.

In giving an account of the mode I employed in the improvement of waste and unproductive soils, I have studied the utmost plainness and precision. I shall leave it to speak for itself, when I have previously informed the Society that the want of minute accuracy, observable in different parts of the paper, is to be attributed to the circumstance of my having no intention of publishing an account of my improvements, until the period when I first noticed their premium. While I mention this, however, I must be permitted to declare that I have studied accuracy on every essential point of the subject; and that, in the accounts of money expended on the improvements, I have as studiously avoided error: if I have fallen into any in this part of the account, it is in the moderation of the statement of the charges.

The

The paper is accompanied by a certificate from a Gentleman of eminence in literature; and if farther attestation were necessary, my improvements are of so prominent a nature as to procure it from numerous respectable characters. I humbly therefore offer myself a candidate for the approbation of the Society. If I shall be honoured with success, and if the account of my improvements causes the melioration of any of the many thousand acres of waste land throughout the island, I shall have obtained the utmost object of my ambition.

With warmest wishes for the success of the patriotic views of the Society,

I am, SIR,

Your most humble Servant,

ROBERT BELL.

*Huntsbill, near Jedburg, North Britain.
Dec. 3, 1798.*

MR. MORE.

An

An Account of the Improvements upon an extensive Farm, containing a large portion of Land lying waste and uncultivated.

IN the year 1790 I took a lease of an estate of about eleven hundred acres, situated to the north of the western extremity of the Cheviot hills. It had been recently purchased by a Gentleman of great professional eminence, who was well acquainted with the great and lasting advantages that flow from judicious improvement: it is not to be wondered at therefore, that the learned proprietor was not contented with allowing his lands to remain in a state of comparative barrenness, under a system of agriculture which had hardly emerged from a state of ancient ignorance; he resolved that plenty should occupy the place of long-existing sterility, and let his estate to me upon an improving lease.

At the period when this lease was taken, the estate was divided into four farms: the lease of the principal farmer was
bought

bought up by the landlord, and I entered into the possession of this part of the grounds at the period already mentioned. Two smaller farms came into my hands, the one of them one year, and the other four years afterward. The lease of the remaining farm expired at Whitsunday 1798; but by the bankruptcy of the farmer, it has been in my occupation since the same term of 1794.

Such being the state of the leases on the estate, my rent was of a progressive nature. When I entered into the possession of the first farm, I paid £.270; and at the expiration of the lease of the second small farm, my rent was advanced to £.297. It was at this period that I entered on the farm, the occupier of which had become insolvent: I continued to pay his rent until Whitsunday 1798, the time at which it would have regularly fallen into my possession. At this term my rent rose to £.550, at which sum it continues stationary until the expiration of the first twenty-one years, when
it

it rises to £.700 for the remaining period of the lease.

This progressive mode of affixing the rent was considered equally advantageous to both landlord and farmer: the former was benefited by getting an increased rent upon the lands which were first occupied, by the augmentation of his rental, in a short period, from £.312 to £.550, and in receiving, besides the great emoluments arising from plantations, a return of seven per cent. during the last years of the lease. The advantage to the occupier of the lands arose from the circumstance, that as his improvements extended, the soils were more able to afford an additional rent.

The estate was in so wretched a situation, that this increase of rent could not be produced but at the expence of great sums laid out upon the improvement of the land. That I might be indemnified therefore for this necessary expenditure, the term of the lease was made forty years; and at the expiration of twenty-one, the option of two lives

was

was in the choice of the farmer. The landlord, still further to encourage the improvement of his estate, bound himself to advance £.800, in sums of £.200, every six months, to the farmer, to be expended upon the lands; and to give about an equal sum for the erection of a good farm-house and farm buildings. The farmer was also allowed a power to sub-let the grounds for any period, not exceeding that of his tenure of the estate.

In consideration of these advantages, I bound myself to manure the whole lands, and to bring them into a state fit for producing corn; except a portion of them, which was in a mossy, boggy condition. The draining of this moss was, however, enjoined, as well as the inclosing of the estate. I likewise obliged myself to add about £.300 in carriage and other labour to the sum given for the buildings, and to pay five per cent. for £.400 of this money advanced by the landlord.

These are the principal features of my lease, which I have thought it necessary to particularize

particularize in this place; they bespeak the most liberal views in the enlightened proprietor, and are deserving attention from their being eminently calculated to excite the exertions of skill and industry in the improvement of waste and unproductive soils.

In commencing the improvement of my farm, the first object that demanded attention was to shelter the lands in so high and exposed a situation. The surface of the estate is a rising ground, sloping chiefly to the south, and in a less degree to the north: the greatest and best part of the land is contained in the southern slope, at the bottom of which is the moss, formerly noticed. It is sheltered on the south by an opposite higher ground; so that, as the estate is of a pretty regular square form, there were only three sides upon which shelter was required.

A small space upon the eastern extremity of the estate, where it was not thought proper to plant, was fenced with a double ditch and hedge; but around all the remaining exposed border, a plantation of Scotch
firs,

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firs, about a hundred feet in breadth, was made. This plantation was inclosed with turf dikes, calculated to protect the plants for many years; and a similar plantation, extending from one extremity of the estate to the other, was carried along the brow of the hill in a waving line, to shelter the grounds on each side below. The plants are making rapid progress towards maturity, and will amply reward the proprietor for his expences of planting.

These plantations were calculated to afford a general shelter; but over a wide range of surface more immediate protection was necessary. Inclosing is every where highly advantageous and proper, and I cheerfully fulfilled my obligation of subdividing the lands: the mode of inclosing which, of all others, recommended itself for adoption, was that of ditch and hedge.

There were no inclosures upon the grounds, except a few bad hedges in the neighbourhood of the mansion-house, which is situated upon the north side of
the

the estate: the inclosures upon this part of it were completed, and ten square fields, containing about an hundred acres of land, were formed. I expended a small sum of money in manuring a part of these inclosures, and sub-let them, upon a short lease, to a Gentleman who, though previously unacquainted with agricultural pursuits, has nevertheless successfully improved his farm after the example set him in the improvement of the other parts of the estate.

The lands upon the south side of the plantation running along the high ground, were all subdivided into regular inclosures in the course of the winters 1790 and 1794: the fields vary in size according to the nature of the surface, but the general quantity of ground they contain is about twenty acres. The hedges are all run in strait lines, and all the inclosures are regular squares, except those which are bounded by the plantations, by the double ditch and hedge on the east border of the estate, or by the moſs at the bottom of the hill. The

N thorns

thorns have advanced rapidly in their growth, and many of the hedges are already perfect fences.

This rapidity of growth is to be ascribed to the great attention which was paid to the pulverization of the soil for a considerable depth; and to the manuring it with lime and rich stable-yard dung, previous to the planting of the thorns. This effect has also arisen from the after-care which has been bestowed upon the plants in keeping them free from weeds, properly pruned, and their roots always covered with earth: for these purposes a hedger is kept upon the estate, at the mutual expence of the landlord and farmer; and when he requires assistance, I pay labourers to work under his direction.

Besides this care of the plants, however, much attention also is paid to the protection of the hedges from the injuries they are liable to sustain from the sheep grazed in the fields. The ditch affords a sufficient barrier on one side; but on the exposed side
of

of the hedge there is a necessity of running a paling of three bars at the distance of a foot from the thorns: the wood for this paling is given by the proprietor from a plantation of Scotch firs upon the estate; it is erected at my expence, and there is sometimes a necessity of renewing it before the thorns have arrived at such a degree of strength as to be no longer obnoxious to injury.

It is worthy of notice that those thorns which were planted the earliest in the season have every where thriven the best.

I shall not unnecessarily add to the length of this paper, by describing the particular mode of constructing my ditch and hedge; I shall only state that I have made five thousand six hundred and forty-three roods (each rood containing six yards) of this kind of fence; and that this quantity of inclosing, together with the expence of protecting the hedges, has cost me the sum of five hundred and sixty-four pounds.

Having given this account of the inclosing of the principal part of the estate, we are prepared to enter upon the discussion of the next subject which claims attention previous to the account of the improvements; viz. the state of the lands and mode of occupation at the time when I entered into possession.

Within the last fifty years the agriculture of Scotland has undergone rapid and extensive improvement: the antiquated and unproductive system of our forefathers has given place to the principles of agriculture which have flourished and been perfected in many parts of the sister kingdom; and in this particular county there are few districts over which improvement has not extended its beneficial influence. In the number of these districts however, was situated the estate, the improvements upon which make the subject of this communication to the honorable Society for the Encouragement of Arts, Manufactures, and Commerce: here Prejudice had fixed his dominion; and
after

after the ancient mode of husbandry, the soils were divided into what was termed *in-field* and *out-field* land, and into moor land, meadow, and bog.

The *in-field* land was that part of the estate which consisted of the richest soil, and in the present instance amounted to about three hundred and thirty acres. It was considered worth a rent of ten shillings an acre, and was managed in the following manner. The land was summer-fallowed, cleaned of weeds, and sown with barley or oats, and sometimes with wheat. The farmers produced, however, very small quantities of the last grain; and their established mode of managing this kind of soil was to take four or five crops after fallow, and then to repeat the same unproductive system of fallowing and hard cropping: they raised very small quantities of turnep, and these too only during the last years of their occupation of the grounds.

The *out-field* land was of a poorer quality; a part of it was valued at five shillings

lings, but the greater proportion of it was only rated at three shillings per acre. The quantity of this soil was about three hundred and twenty-five acres; more than two parts of it were always in a state of natural grass, and the remainder was cropped with oats.

In order to bring this land into a state fit for producing corn, they folded a portion of it with sheep, and ploughed it up in the proper season for oats. They renewed this crop for four or five years, until the land was so over-run with couch-grass and other noxious weeds, which possess a barren worn-out soil, that it was incapable of producing even the most scanty returns; it was therefore allowed to remain in this waste impoverished state, until it was again folded in rotation: the vegetation of the weed grass and other weeds produced a barren herbage, and the land was pastured with sheep.

The sheep were grazed in common, upon this out-field land, and upon the moor land,

land, which composed considerably more than a third part of a estate: about a hundred acres of this soil were woodland; and that part of which was in the occupation of the farmers, and amounted to more than three hundred acres, was not estimated at a greater rent than one shilling per acre. It required one acre of the out-field, and four of the latter description of land, to maintain one sheep throughout the year, and that too in the poorest condition. The sheep were always small, and never could be fed fat upon the pasture; the lambs produced from the ewes were equally bad, and at an average were never sold at above five shillings per head.

The produce throughout their farms may readily be conceived to have been of the poorest nature, when it is known that several of the farmers were unable to pay the small rents they held them at, became insolvent, and were obliged to give up their leases to the landlord. It is indeed a subject of wonder how they were able to discharge the most

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moderate rents ; for, with the additional information that the meadow and mofs land was adequate to the maintenance of a few black cattle only, the above relation is a faithful picture of the wretched means they employed to draw them from the lands. By this mode of occupation it must appear how great a proportion of their farms lay in an impoverished waste state at the time when I rented the estate: the best soils produced very poor crops, and the degree of fertility of the out-field land has been already noticed. A great proportion of this kind of soil was lying waste in a state of natural grass; and there was likewise a considerable quantity of it which had never been subjected to the operation of the plough. Upon this portion of land, furze, broom, heath, and ling, were the common productions: the moor, meadow, and mofs land, were in a state of nature; nothing had been attempted to meliorate them.

In such a situation, where so much was to be done, and where every spot of land

was

was unproductive or waste; general improvement was an arduous undertaking: I had, however a clear perception of the advantages that would result from my plan of improvements, and resolved to execute them with the necessary spirit and perseverance. How far this plan has succeeded will be afterwards seen; but before we direct our attention to the account of the improvements, it is proper that I should state the nature of the soils which have been the subject of melioration, and premise a few observations upon the labour requisite to the carrying on my operations.

The soils throughout the estate differ greatly in quality, though very little in kind, except in the moor and moss land: they vary from a dark, heavy, loamy clay, to a light soil of the same nature: the substratum is a free stone rock; the soil of the moor land is a few inches of black moorish earth, upon a stratum of clay; that of the moss is a deep peat earth. This difference of soils did not prevent me from adhering to
a regular

a regular plan of inclosure, as I was convinced that improvement would render each soil capable of the same mode of culture, and hence that variations of soil included in the same field would not be productive of inconvenience.

Labour is a part of the expence in the improvement of waste or unproductive soils, which in every situation must prove considerable: the land is incapable of maintaining the quantity of stock that is necessary: foreign assistance is required; and the improvements are executed at great additional expence.

In carrying on the improvement of my farm, I was much assisted by labour, supplied from two other farms, which I possessed at some miles distance. By means of these I was always enabled to keep six draughts upon the improving farm, and frequently ten during the summer. The ploughs and carts are drawn by two horses only, and the ploughmen rank among the most expert in the kingdom: the plough
which

which is in common use, throughout all the improved districts of Scotland, is Small's chain-plough; an engraving of which is given in different agricultural publications. I use it without the chain, and can give my testimony in favour of the general utility of this esteemed plough.

The manual labour always required a number of labourers, besides those employed in ploughing, carting, and harrowing: in estimating the expence of the latter operations, I have made full allowance for the advantageous circumstances under which they were executed.

When I entered upon the improvement of my farm, it was my object to complete it in those fields which contained the greatest proportion of good soil. The grounds which were under cultivation were improved at less expence of labour than the uncultivated lands; but the only difference in the improvement of the various soils, arose from the length of time necessary to the pulverization of the waste and moor land.

land. My intention, in every situation, was to bring the soils into a state of fine tilth, and thus render them fit for the reception of manure, and a crop of turnep.

The surface of the lands which had been under cultivation, prevented many great irregularities, wet marshy places, and numerous land-stones collected in several parts into heaps. Many of these land stones were of great size, and could not be carried off the grounds: for these, stone pits sufficiently deep to admit of their being covered with fourteen or fifteen inches of mould, were dug; and, as a proper precaution, the pits, when there was a declivity, were sunk at the upper side of the stone. When these stones had thus been removed, and when the wet parts had been successfully drained with covered drains, the cultivated grounds were ploughed in the beginning of winter; and by the repetition of this operation, with the assistance of the spade, every hurtful inequality of the surface was levelled.

The

The quantity of labour requisite to the pulverization of the soil varied according to the nature of the ground: that portion of the cultivated soils which was managed as in-field land, required three ploughings; but the part of them which came under the denomination of out-field, demanded the quantity of labour which was bestowed upon the same description of land, lying waste in grass, after it had been cropped with oats.

Upon the improvement of this part of my farm I shall not be more particular, as the other parts of the process will be comprehended under the account of that of the waste land. I have, however, placed amongst the tables of expenditure, one to shew the expence attendant upon the melioration of the best soils.

The improvement of the proper subject of this paper, the waste and moor land, comes now under review; and that I may avoid confusion in the account of this process, I shall divide the grounds into two kinds;

kinds; viz. into that portion of out-field land which was exhausted and lying in a state of natural grass; and into that which had never been subjected to the operation of the plough, and was over-run with furze, broom, heath, and ling. In detailing the improvement of the last species of waste land, I shall comprehend under the same head that of the wet marshy ground and moor land.

In effecting the melioration of the first description of waste land, the preliminary steps of land-draining the wet places, and of removing the land-stones which obstructed the progress of the plough, were executed.* The last operation was peculiarly necessary; for besides the numerous land-stones diffused over the general surface of the grounds, there were great collections of them upon balks, which had been formed by the slovenly husbandry of ancient farmers

* I have this season completed the improvement of a field which contained an astonishing quantity of land-stones. In this inclosure there are the remains of what

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farmers on the estate: these balks occurred over all the lands which were or had been under cultivation.

On the removal of every material obstruction, the land was ploughed with a common furrow in the month of November; and about the end of the following spring it was sown thick with oats. The produce of this crop was always of the poorest nature, and did not make a return of three times the quantity of the seed: it however indemnified me for the labour which had been bestowed upon the ground; and the cropping answered the purpose for which it had been employed.

When I commenced the improvement of this description of land, I fallowed and wrought it for two years: I soon, however, found the error of this practice, and the great
expence

is believed to have been a Danish encampment; and, upon an adjoining property, there are two out-posts at a small distance. I have completed the filling up of the outer ditch, which time had not perfected, and the peaceful ploughshare now passes over that spot where erst embattled hosts poured forth terror and destruction.

expenditure of labour attendant upon the adoption of it. The soil was choked with couch-grass and other noxious roots ; and upon lying for even a few weeks, especially in wet weather, the land became nearly as much filled with grass as when the sward was first broken up. To remedy this inconvenience, I first thought of sowing the ground thick with oats : the effect has answered my expectation, for by the growth of the oats the couch grass is prevented in a great measure from springing up, the soil is loosened, and much less labour is requisite to its pulverization.

The oats having been removed, the land was again ploughed in the end of autumn, and exposed to the action of the weather and temperature of the winter season in the state of a rough furrow : it was cross-ploughed in the beginning of April, and afterwards braked* and harrowed. About the

* This operation is performed by an implement resembling in every respect a harrow, except that it is larger, heavier, and has longer tines.

end of the same month it was again ploughed, braked, and harrowed; and in May the ploughing and harrowing were repeated. In the course of this labour it was sometimes necessary to pass a heavy roller over the land, in order to break down the firmer clods.

Upon the completion of the last harrowings the roots of the couch-grass were carefully collected and burnt: the land stones were removed off the grounds as they were turned up by the plough; and by means of this implement and the spade, every hurtful inequality of the surface was destroyed.

When this labour had been bestowed, the soil was brought into a state of sufficient fineness for the application of manure. Before I proceed to give an account of this part of the subject, however, I shall previously detail the mode of tillage I employed to bring the second description of waste land into a similar situation.

The furze and broom having been removed off the ground, the draining of the

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wet places completed, and the larger land-stones carried off, the land was ploughed in November.* The furrow was made about four inches in depth, and allowed to remain in the coarse state in which it had been formed by the plough throughout the winter: the land was cross-ploughed in May following, and afterwards braked and harrowed. It was again ploughed, braked, and harrowed, in July or August; and after the completion of the last part of the labour, it was ploughed into ridges of nine or twelve feet in breadth. The furrows were well cleaned out by the plough, to prevent the rain water from stagnating upon the lands; and they were again exposed to the influence of the winter's frost.

The furrows were filled up by the plough about the end of the succeeding spring, and the land was again cross-ploughed and harrowed. After this harrowing, the roots of
of

* The broom was sold for fuel: the price received for it, defrayed the expence of its removal, as well as that of the furze.

of the ling, and other coarse grasses which had not perished during the eighteen months the land had lain in fallow, were collected into small heaps and burnt into ashes. Upon this incineration the land was for the last time ploughed and harrowed; and those roots which had escaped observation were destroyed by a second burning.

In the course of the labour bestowed upon the grounds, the land-stones were carted off the field as they were brought under observation, and every injurious inequality of the surface was levelled. The land was therefore, by this process of culture, freed from every foreign hurtful substance, and the soil was perfectly pulverised and rendered fit for its combination with manure.

When I had brought the lands into this state of fine tilth, another more expensive part of the process of improvement followed; viz. the manuring of soils, wasted and exhausted of animal and vegetable matter.

The manure which forcibly recommended itself in such a situation, was lime: dung, though in a less degree, was also necessary and essential to the melioration of soils lying in such a condition. I was situated at a great distance from the former kind of manure, but nevertheless resolved to use it in a quantity adequate to the purpose for which it was employed; convinced that too strict an economy in this instance would be productive of certain loss: I had it in my power to command a sufficient quantity of dung, and raised in the manner afterwards described.

In the application of these manures the quantity was regulated by an attention to the nature of the soils; as these varied from a degree of richness to poverty, the lime and dung were applied in quantities adequate to their melioration. The extent of their application will be detailed in the tables of expenditure.

The lime was laid upon the lands about the end of May, and immediately after its application

application they were ridged into drills of twenty-six inches for turnep: the dung was now laid on, and being ploughed down, the turnep seed was sown upon the hot furrow.

Such is the method I have practised in improving my farm: its excellence and success will best be shewn by introducing in this place, an account of the produce arising from the increased fertility of the soils.

The turneps have always proved an excellent crop, even upon the most clayey soils: they are eaten upon the ground by sheep, properly folded with nets; except a small proportion of them, which is given to black cattle. A very small quantity of them, however, has been used in this manner, as the first method of consuming them is highly advantageous to every kind of soil, more particularly to lands recently improved. The profit upon the crop has varied with the state of the market for fat stock; but in general its absolute value has not been less than £.3: 10s. per acre.

When the turneps are eaten off, the lands are ploughed in the proper season for a crop of barley: and as it is my principal object in the improvement of my farm to lay the grounds down to pasture as speedily as possible, I sow along with the barley the following quantities of grass seeds: of broad clover, twelve pounds; white clover, four pounds; rib grass, two pounds; and of the best rye grass, one bushel.

The crops of barley have proved equally good as that of the turnep; and in general, each acre has produced about five quarters of grain.

The grass seeds have always answered my most sanguine expectations: the crop is never cut for hay, excepting only a small quantity of it, which is required for a part of the stock upon the farm. It is pastured by ewes and lambs; and to shew the value of the grass, I shall give an account of the manner in which it is grazed.

In September or October I purchase about five hundred ewes, of the Cheviot breed, which

which are sold by the stock farmer under the denomination of draught ewes. These ewes are crossed about the middle of the latter month with tups of the Dishly breed, and are pastured through the winter upon the moor and waste land, yet unimproved, and upon a similar pasture of one of the farms already mentioned. They begin to drop lamb about the first of April, and are then put into the grass fields: these are never grazed after the first of January, so that when the ewes are put upon the grass it is always a luxuriant pasture; it feeds upon an average four ewes and lambs per acre.

The lambs are sold fat in the months of June or July, and in general bring 12s. 6d. per head. The ewes are continued on the pasture until the end of October, when they are either sold for an increased price of five shillings each, or, as is more generally my practice, put upon turnep to be completely fattened. Upon the removal of the ewes, the grass is eaten by young black cattle, and other stock upon the farm,

until the end of December. They are generally benefited by this pasture; and the advantage it is of to them, fully compensates for the maintenance of the ewes throughout the winter. It appears therefore, from this statement, that £.3: 10s. is the profit upon each acre of grafs.

The mode of pasturing is followed on the succeeding year: but having found that new grafs is greatly preferable for feeding lambs, I plough up the grafs fields in the third year, and sow them with oats; which generally have been of such a quality as to produce six quarters per acre.

The oats are followed by a crop of wheat, if dung is plentiful, but more frequently by another crop of oats or one of peas. This pulse and the wheat have, upon an average, been produced in the quantity of twenty-nine bushels per acre; and in a field which was last year sown with this grain, and which contained several acres of moor land, the crop was most luxuriant upon this formerly barren heath.

This

This plan of cropping is varied according to circumstances; but my fixed mode of management is to take alternately a green and a white crop; and never, after breaking up the grafs, to sow more than two crops before the land is again prepared for turnep. When the turneps are sown, the land is again manured with the original quantity of dung, and is again laid down to pasture with a barley crop.

It appears therefore that every attention is paid to avoid heavy cropping; and it is not less evident that, by the prosecution of this plan of management, large additions of animal and vegetable matter will daily increase the richness and fertility of the soils.

Having now detailed the mode of improving the arable lands, and given an account of the produce arising from the melioration of the soils, I shall, before I state the expence of the improvement, concisely relate the steps which have been taken for increasing the value of the moss land.

When

When I took the lease of my farm, this part of it was in the state of a wet and unproductive bog. It was only adequate to the support of a few crops and young neat beasts; and a great part of it was so perfectly boggy, that it was incapable of supporting the cattle, which grazed upon the firmer parts of it and upon an adjoining meadow.

The first step in the improvement of such land, was to carry off the superabundant moisture by draining. I had formerly recovered about thirty acres of land upon another of my farms, which was an entire marsh; and I did not despair of the success of a similar mode of improvement in the present instance. In attempting the melioration of the moss land therefore, my first object was to run a principal drain, stretching from the inferior to the superior part of it, where it is widely extended upon an adjoining estate; and to intersect it by smaller drains, terminating in the main conductor of the water. I accordingly had this drain completed in the second year of my occupation

pation of the estate: it was made six feet deep, twelve feet wide at the top, and eight at the bottom; and since its formation it had been repeatedly cleaned out. The intersecting drains have not been executed, and I do not apprehend that it will be necessary to fulfil this part of my intention.

The success of the principal drain has answered my expectations; there has been always an abundant flow of water. The moss is in various parts converted into meadow, and there is hardly any part of it except where pits have been dug for peat, that is not pretty firm and productive of support to the cattle grazed on it. The adjoining meadow is likewise greatly meliorated; the grasses are much finer; and many parts of it are fit for producing corn.

The advantages attendant upon the fulfilment of a part of the plan of draining, are of the most promising nature. How far the completion of it would insure the speedy
 exiccation

exsiccation of the moss, I cannot pretend to determine. This object however seems more likely to be effected by another mode of draining, recently published to the world: I need hardly say, I mean that practised by Mr. Elkinton.

I have lately seen Mr. Johnston's perspicuous account of this mode of draining, and have resolved to practise it in preference to my original plan. I propose to bore auger holes in the bottom of the principal drain immediately; and thus allow a free exit to the waters which circulate below the level of its bottom. From the nature and situation of the strata observed in an unfruitful search after marl, I have no hesitation in pronouncing the success of this intended operation: I have still less in expressing my hopes of converting this hitherto useless part of the estate into a valuable pasture-ground.

The moss, besides a considerable quantity of meadow hay, already produces sufficient support for ten cows, and twenty
young

young black cattle. These cattle are grazed upon the mofs through the day; and are fed with straw in a court-yard during the night. The yard is always well littered with straw; and as this is converted into dung, new layers of fresh straw are added, until such a quantity of excellent dung is formed, as is adequate to the manuring of sixty or seventy acres of turnep.

Such are the improvements I made upon my farm. The expence at which they have been executed will be shewn by the following tables of expenditure.

I.

*Average Expence of improving the best Soils,
denominated In-field, per acre.*

					£.	s.	d.
First ploughing	-	-	-	-	0	5	0
Second ditto	-	-	-	-	0	5	0
Braking and harrowing	-	-	-	-	0	3	0
Third ploughing	-	-	-	-	0	5	0
Second harrowing	-	-	-	-	0	2	0
					<hr/>		
Carried over					1	0	0

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	£.	s.	d.
Brought over	1	0	0
Collecting and burning the couch grafs and other weeds - - - -	0	3	0
Collecting and removing the land stones* -	0	7	0
One hundred and sixteen bushels of lime	4	7	0
Twenty cart-loads of dung, weighing 3 cwt.	2	0	0
First drilling for turnep - - - -	0	2	6
Second ditto - - - -	0	2	6
	<hr/>		
	£.8	2	0

II.

Average Expence of improving that description of Land termed Out-field, the greater proportion of which was lying waste in a state of natural grafs, per acre.

	£.	s.	d.
First ploughing - - - -	0	6	0
Second ditto - - - -	0	5	0
	<hr/>		
Carried over	0	11	0

* In this estimation of the expence of the labour bestowed upon the land, is comprehended that of the manual assistance sometimes requisite to the levelling of the surface; and the breaking of the clods by rolling. Neither of these operations could be made distinct heads of charge. The first was very partially required; and the rolling was only necessary in the most clayey soils, and there only after a wet season. It was very seldom needed by the soils comprehended under the second table; and those referred to in the third, never demanded its assistance to their perfect pulverization.

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					£. s. d.
				Brought over	0 11 0
Braking and harrowing	-	-	-	-	0 3 0
Third ploughing	-	-	-	-	0 5 0
Braking and harrowing	-	-	-	-	0 2 0
Fourth ploughing	-	-	-	-	0 5 0
Third harrowing	-	-	-	-	0 2 0
Collecting and burning the couch grafs and					} 0 5 0
other weeds	-	-	-	-	
Collecting and removing the land stones	-				0 14 0
One hundred and sixteen bushels of lime	-				4 7 0
Twenty cart-loads of dung, weighing 3 cwt.	-				2 0 0
First drilling for turnep	-	-	-	-	0 2 6
Second ditto	-	-	-	-	0 2 6
					£.8 19 0

III.

*Average Expence of improving the Moor Land
and Waste Out-field which had never been
under cultivation, per acre.*

					£. s. d.
First ploughing	-	-	-	-	0 7 6
Second ditto	-	-	-	-	0 6 0
Braking and harrowing	-	-	-	-	0 3 0
Third ploughing	-	-	-	-	0 5 6
Braking and harrowing	-	-	-	-	0 3 0
Fourth ploughing	-	-	-	-	0 5 0
					Carried over 1 10 0

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						£.	s.	d.
					Brought over	1	10	0
Fifth ploughing	-	-	-	-	-	0	5	0
Third harrowing	-	-	-	-	-	0	2	0
Sixth ploughing	-	-	-	-	-	0	5	0
Fourth harrowing	-	-	-	-	-	0	2	0
Collecting and burning the roots of the ling, &c.						0	3	0
Collecting and removing the land stones						1	2	0
One hundred and thirty-five bushels of lime	-					5	1	6
Twenty-five cart-loads of dung, weighing 375 cwt.						2	10	0
First drilling for turnep	-	-	-	-	-	0	2	6
Second ditto	-	-	-	-	-	0	2	6
						<hr/>		
						£.11	5	6
						<hr/>		

These tables shew, as correctly as it was possible to do at the time of their construction, the expence attendant upon the melioration of each acre of the three descriptions of soils which have been the subject of improvement. In stating the different heads of expenditure however, it was impossible to affix to each acre of land a certain proportion of under-draining, as the necessity of this operation was not only partial, but infinitely varied in different situations,

tions. This part of the expence of improvement, therefore, will be noticed in the general table of expenditure.

The quantity of soils which are already improved, amounts to four hundred and sixty-eight acres: the portion of land which comes under each table of expenditure is not easily ascertained, as improvement has wrought a wonderful similarity in the appearance of the surface of the grounds. I have, however, examined all the improved fields with great care and attention; and have had the different quantities of each kind of soil measured with as great a degree of precision as it was possible to command. To extreme accuracy I cannot pretend; but I am certain, if there is any error, that it is of the most trifling nature, and wholly underserving of notice.

Having premised thus much, we are prepared to enter upon the general statement of the expence of the improvements which have been executed upon my farm. In

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giving this statement, however, it is necessary to observe that there was no possibility of noticing every expence connected with the plan of improvement. In the execution of this plan various small sums were required by different objects; and where the improvements were executed on so considerable a scale, it may easily be imagined that the contingent expences must have been considerable. There is, however, but little reason for regretting the deficiency of this part of the general table of expenditure, as an account of contingencies, besides adding to the amount of the sum expended, would be productive of very little useful information.

General Table of Money laid out upon the Improvements already executed on my Farm.

	£.	s.	d.
Inclosing and subdividing the lands . . .	564	0	0
Farmers proportion of the labour bestowed } upon the hedges }	60	0	0
Improving 274 acres of land comprehended } under the first table of expenditure. }	2229	8	0
<hr/>			
Carried over	£.2853	8	0

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	£.	s.	d.
Brought over	2853	8	0
Improving 121 acres of land comprehended under the second table of expenditure, nearly fifty acres of which were lying waste, in a state of natural grass - - }	1082	19	0
Improving 73 acres of land comprehended under the third table of expenditure, 42 acres of which were moor land }	823	1	6
Manuring a part of the fields around the manſion-houſe before they were ſub-let }	55	0	0
Draining the wet places diſperſed through- out the lands which have been improved }	30	0	0
Draining the moſs - - - - -	110	0	0
Repairing one of the farm-houſes, and erecting and repairing cottages for the accommodation of labourers employed in carrying on the improvements - - }	250	0	0
	<hr/> £.5204 8 6 <hr/>		

Such is the moderate eſtimation of the ſum I have expended in executing the improvement of waſte and unproductive land. I ſhall not indulge myſelf in any obſervations on its magnitude, convinced that ſilence is here equally proper and impreſſive.

The expenditure has indeed been to a great extent; but it is alſo true that it has been productive of the moſt lucrative returns. The ſoils which were in the im-

verished condition formerly described, are greatly enriched: various parts of my farm are worth fifty shillings an acre; and all the improved lands, upon an average, would be cheaply rented at thirty shillings per acre. I indeed sub-let a field of twenty-five acres to a small farmer, a twelvemonth agó, for forty-five shillings an acre, which before its improvement was not, upon an average, worth more than seven shillings: he pays his rent by labour in carrying lime to the parts of the estate yet unimproved.

The improvements have been too encouraging in their effects to leave any hesitation about the propriety of completing them; I go on to fulfil the obligations of my lease. All the inclosures on the south of the plantation, stretching along the high ground, are improved, except three; and these I propose to plough up immediately: they consist of waste and moor land, and of out-field lying waste in a state of natural grass.

In order, likewise, to make the remaining part of the estate fit for the process of improvement,

improvement, the subdivision of the grounds upon the north side of the plantation just mentioned, will be completed in the course of this winter. The grounds, in this part of the estate, are of the same nature as those which compose the unimproved fields on the south side. The improvement of all the soils, which have been permitted to lie in the unproductive state they were in at the period of my entry into the farm, will not be completed at a less expence than that of the same descriptions of land referred to in the second and third tables of expenditure.

It is impossible to fix the period when the improvement of the whole land will be completed: circumstances may hasten or retard my operations. I calculate, however, upon an end to my expences and improvements in six or seven years: I shall then enjoy the fruits of much labour and exertion. The difficulties engendered by industry will give place to ease and quiet; and I shall have the further reward of enjoying the consciousness of having proved no unuseful

member of society, in having increased the fertility of a portion of the earth, in having supported a more numerous population, and in having augmented the value of an estate, in no long period of years, from three hundred and twelve to more than twelve hundred pounds per annum.

I THOMAS SOMERVILLE, Minister of Jedburgh, in the county of Roxburgh, do hereby certify, that I reside near the estate of Hunthill; that it is consistent with my knowledge, that the improvements made by Mr. Robert Bell upon the said estate have been skilful, profitable, and far beyond the extent required by the Society for the Encouragement of Arts, Manufactures, and Commerce; and that the land improved corresponds to the description specified in Article 104 of the list of Premiums, inserted in the sixteenth Volume of their Transactions. But being unqualified to judge either of the expence of improvement, or the increased value
of

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of land, I wish to decline to give any opinion or attestation on that part of the subject; though I know no reason for calling in question the veracity of Mr. Bell, who has been long known to me; as witness my hand, this third day of December, 1798,

THO^s. SOMERVILLE.

The second Premium offered for IMPROVING LAND LYING WASTE OR UNCULTIVATED, being the SILVER MEDAL and TEN GUINEAS, was this Session adjudged to Mr. JOHN FOX, of Boxhill, Surrey, from whom the following Account and Certificate were received.

SIR,

OBSERVING in the Abstract of the Premiums offered by the Society instituted at London, for the encouragement of Arts, Manufactures and Commerce, that under Class 104 a Premium is offered for improving Land lying waste or uncultivated, I have taken the liberty to inclose you the particulars and account of the expences in the cultivation and improvement of one hundred and seventy-two acres of Land which were waste and uncultivated, at a place called Boxhill in the parish of Dorking, in the county of Surry; but which, in the years 1797 and 1798, I caused
to

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to be cultivated, and which is now in a proper state of cultivation; and I have specified the mode by which such land was cultivated.

I shall, Sir, esteem it a favour, if you will have the goodness to submit the enclosed to the Society; and should my exertions be deemed worthy their attention, and they are pleased to think me entitled to the Premium under Class 104, I shall be happy to have been in the least instrumental in forwarding their laudable purposes and views. If the Society should require any further particulars relating hereto, or if any further certificates are necessary, as to the fact of my improvements or my personal attendance at any time, I shall be obliged to you for the favour of a line, which will be duly attended to by me.

I am, Sir,

Your obedient Servant,

JOHN FOX.

*Boxhill, Dorking,
Surrey, Dec. 1, 1798.*

Mr. MORE.

A

A Certificate of the Improvement of Land lying waste at Boxhill, in the Parish of Dorking, in the County of Surrey, lately belonging to Sir Henry Powlett, Sir John Mildmay, of Dogsmearsfield Park, Hants, Baronet, but now belonging to Henry Peters, Esq. of Betchworth Castle, Surrey, and in the occupation of me John Fox, in the Year 1797, and an account of the Expenses attending such Improvement.

THE land being a large quantity, and lying in an uncultivated state on a hill called Boxhill, I proceeded on my design, and made choice of the north part of the said hill, which consisted, one part in red marle, in another part chalk loam, the depth of from ten to fifteen inches. Underneath lies a chalk rock, and the only vegetable produce was a spongy moss bent grass. With this were mixed some coarse half-dead grass, which all cattle refused, except sheep in the winter, when every other plant was destroyed, and the ground became

became bare. I began the first operation by paring off the surface to the depth of about three inches, and which, as soon as dry, was burned in heaps at convenient distances, for the benefit of spreading the ashes. This was done all summer, from February, 1797, to October following, for different crops; first, from February the 11th, to the first day of May for oats, fifty acres; from the 1st of May to the 15th of July, for turneps, thirty-five acres; from the 15th of July to the latter end of October, twelve acres for wheat.

The following is the estimate of the expences of cultivation; and the quantity of oats sown on the first fifty acres was about five bushels per acre, and produce about seventy bushels per acre. The oat-ash I ploughed, and sowed with wheat, about three bushels per acre, and produce about twenty-six bushels per acre. The thirty-five acres sown with turneps were worth about two pounds per acre. In the spring of 1798, the same land I sowed with barley, about four bushels
per

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per acre; produce, about fifty bushels per acre. The twelve acres sown with wheat, 1797, from paring and burning, before any other crop, I sowed three bushels per acre; produce, about thirty bushels per acre.

The following is the estimate of the Expence and Produce of one Acre.

One acre of the fifty, sown with oats.

	£.	s.	d.		£.	s.	d.	
Paring and burning, and spreading, ashes	2	4	0	Value of the Crop of Oats, per acre	9	18	0	
Ploughing for oats	0	12	0	Straw	1	4	0	
Seed	0	17	6					
Harrowing	0	3	0			11	2	0
Mowing	0	3	6	Expences	4	13	0	
Threshing	0	13	0					
	£.4	13	0	Balance	6	0	9	

Wheat on the above fifty acres sown in
in September 1797.

(One acre.)

(One acre.)				£. s. d.			
£. s. d.				Value of the Wheat			
Ploughing	0	10	0	Crop per acre	7	0	0
Seed	1	1	0	Straw	1	5	0
Harrowing	0	3	0				
Reaping	0	12	0		8	5	0
Thraffing	0	10	6	Expences	2	16	0
	£.2	16	6	Balance	5	8	6

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£. s. d.	£. s. d.
Ploughing for barley, per acre . . . 0 10 0	Value of the Crop of Barley, per acre . . . 9 0 0
Seed 0 15 0	Straw 1 5 0
Harrowing 0 3 0	
Mowing 0 3 6	
Thrashing 0 12 0	Turneps 10 5 0
	2 0 0
<u>£. 2 3 6</u>	<u>12 5 0</u>
Expence of Turneps 3 7 0	Expence 5 10 6
<u>£. 5 10 6</u>	<u>Balance £. 6 14 6</u>

Thirty-five acres for Turneps.

Expences for one acre.

£. s. d.	£. s. d.
Paring, burning, & spreading ashes 2 4 0	Value of the Turnep Crop, per acre 2 0 0
Ploughing 0 10 0	
Harrowing 0 3 0	
Turnep seed 0 8 0	
Hoeing 0 8 0	
<u>£. 3 7 0</u>	

The following is an estimate of the Expences and Produce of one Acre out of the twelve Acres of Wheat sown.

£. s. d.	£. s. d.
For paring, and burning, and spreading ashes, per acre . . . 2 4 0	Value of the Crop of Wheat, per acre 9 0 0
Ploughing, do. 0 10 0	Straw 1 5 0
Seed 1 1 0	
Harrowing 0 3 0	10 5 0
Reaping 0 12 0	Expence 5 0 6
Thrashing 0 10 6	
<u>£. 5 0 6</u>	<u>Balance £. 5 4 6</u>

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Seventy-five acres of land cultivated, and not pared and burnt, on Boxhill Farm, early in the year 1797, on the west part of the said hill, was covered with juniper bushes and thorns, which no breast plough could touch; nor was there any turf sufficient from which any ashes could be collected, nor grafs, but what all cattle refused. In fact, this ground was worth no more than the growth of the junipers and thorns; and the slowness of the growth made it of the small value of one shilling, per acre, *per annum*.

The following is the estimate of the Expence and Produce of the Crop of Oats of seventy-five acres, which were stocked, grubbed, and root-picked.

Seed four bushels per acre.

Produce, about twenty bushels per acre.

	£. s. d.		£. s. d.
Expence of one acre, stocking and cleaning	0 15 0	Value of the Crop of Oats per acre	2 5 6
Picking and fagotting . . .	0 8 0	Straw . . .	0 10 6
Ploughing . . .	0 10 0		
Seed . . .	0 16 0		
Harrowing . . .	0 3 0		
	<hr/>		<hr/>
Carried over	2 12 0	Carried over	2 16 0

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	£.	s.	d.		£.	s.	d.
Brought over	2	12	0	Brought over	2	16	0
Mowing . . .	0	2	9	Expence . . .	1	10	3
Thrashing . . .	0	3	6				
	<hr/>						
	2	18	3				
Value of faggots	1	8	0				
	<hr/>						
	1	10	3	Balance . . .	1	5	9

The following is the estimate of the Expence and Produce of the Crop of Turneps and Rape sown on the seventy-five acres before-mentioned.

Expence per acre.					£.	s.	d.
	£.	s.	d.		£.	s.	d.
Ploughing . . .	0	8	0	Value of the Crop			
Seed	0	1	6	of Turneps and			
Harrowing . . .	0	2	0	Rape seed, per			
				acre	1	2	6
				Expence	0	11	6
	<hr/>						
	0	11	6	Balance	0	11	0

(The whole of which were cultivated in the year 1797, and not any part of the said land before ploughed or cultivated in any manner whatever.)

The above seventy-five acres not having turf sufficient to pare and burn, were not
in

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in a state to receive a second crop of corn; but there is but little doubt that from the crop of turneps and rape being fed off with sheep, it will be in a state to grow oats, and be proper to be laid down for grafs feed.

Acres pared and burnt	97
Acres grubbed, &c. . . .	75

Total	172
-------	-----

I JOHN FOX, of Boxhill in the parish of Dorking, in the county of Surrey, do hereby certify to the Society instituted in London, for the Encouragement of Arts, Manufactures, and Commerce, that the above particulars are in every respect true and just. Given under my hand, this 30th day of November, 1798,

JOHN FOX.

WE whose names are hereunto subscribed, the Minister, Churchwarden, and inhabitants of the parish of Dorking

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Dorking aforesaid, do hereby certify, that we believe the above particulars and account of Mr. Fox's Improvements of Land, which was waste and uncultivated, at Boxhill, in the parish of Dorking, is true; as witnesses our hands, this 30th November, 1798.

SAMUEL GOODINGE, Minister.

EDW. ANSELL,	} Churchwarden and principal Inhabitants.
P. ROTHAM,	
ROB. PIPER,	
JOHN ATLEE,	
GEO. SHEEN,	
SAM. DENDY,	
JOHN WILSON,	}

The following Papers were this Session received in claim of the Premium offered for MAKING HAY IN WET WEATHER; but it having been communicated to the Society, that the manner of *tippling* Clover and Lucerne Hay, as described by Mr. WAKEFIELD, has been long known and practised in some of the Northern Counties, though not in use in the Southern parts of this Island, the Society voted to Mr. Wakefield their SILVER MEDAL, considering that the method is likely to be attended with good consequences, if made generally known through the Kingdom.

SIR,

I HAVE sent to the Society for the Encouragement of Arts, Manufactures, and Commerce, a truss of Clover Hay, and a few tipples of Lucerne Hay, made or cured by a method too little practised, as it secures these grasses from damage in the worst of seasons,
and

and preserves the leaves and blossoms perfect: when intended for seed, the whole is saved. I do not know that any experiments of this kind have yet been made on white hay. The practice is to roll the grafs up immediately after the scythe, into bundles or tipples, of the size of a small barley-sheaf; then draw out a band from one side (leaving it united), twist it as drawn out, and tie it firm round. The tipple being placed betwixt the knees, that part above the band is drawn through the hands with a twist, and the longest grasses drawn out so far as to tie in a knot, which finishes the point of the cone, and forms the tipple. See the cut annexed.



The advantages are evident, as the rain is carried off similar to the thatch of a
Q 2
house,

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house, and the sun and wind have such access as to prevent fermentation, consequently cannot injure in any reasonable time.

I am

Your most obedient servant,

THOMAS WAKEFIELD.

Liverpool, 27th Dec. 1798.

Mr. MORE.

S I R,

THE truss of Clover Hay I sent to the Society, by Mr. Wakefield's orders, is out of one of the stacks on Trafford Moss, and is not superior to the whole. This year I tippled about thirty-six statute acres, and the weather was very rainy for three weeks: last year I tippled upwards of eighty acres, both crops, the first of which was out upwards of six weeks, in almost constant rain, and not touched until it was housed;

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housed; except after a violent wind I sent a man to put up what fallen tipples might be blown down. The expence of cutting and tipping is 9s. per statute acre, and the people got 2s. 6d. per day by the work.

I am

Your most humble servant,

JAMES GREENHALGH.

Trafford Moss, Dec. 28, 1798.

MR. MORE.

LAST winter a considerable quantity of Clover Hay was received at Manchester barracks, by the Princess Royal's own Regiment of Light Dragoons, under the command of Col. M'Daule, which was of excellent quality, and was grown on Trafford Moss. It was cured by the method of tipping, by which means the leaves and blossoms were perfectly preserved. The quantity I believe was upwards of sixty tons.

W. FARMER, B. M.

*Hulme Hall, near Manchester,
December 29, 1798.*

Q 3

SIR,

SIR,

I HAVE duly received your letter of the 15th inst. in which you mention that the Committee of Agriculture request me to inform them respecting the novelty of tipping Clover in cones standing on their bases, bound at the top by bands made of the same clover, &c.

About fourteen or fifteen years ago I procured a husbandman from near Ripley, in Yorkshire, an expert turnep-hoer, who the same year tipped some clover for me, which mode of making Clover Hay I have ever since practised. The man then informed me, it was in common practice in Cleveland, and had been so for many years. I think it the best method of making Clover Hay, and, all things considered, much the cheapest; and some of my neighbours have adopted the practice.

I am, SIR,

Your most obedient servant,

THOMAS ECCLESTON.

Scarisbrick, Jan. 18, 1799.

Mr. MORE.

The

THE SILVER MEDAL was this Session voted to JOHN MIDDLETON, Esq. for the following Observations on various kinds of MANURE.

SIR,

HAVING made experiments with various kinds of Manure on a farm, of which I am the owner and occupier, situate at Merton, in Surrey, for the purpose of ascertaining the most appropriate dressing for the soil, which is a tenacious loam on a substratum, approaching towards yellow clay, I am induced, by the regard I feel for the success of British Agriculture, to request that you will be so obliging as to lay the following observations on the several experiments before the Society for the Encouragement of Arts, Manufactures, and Commerce, for their consideration. I hope and believe that they will be found not altogether unworthy their attention.

Q 4

I. *Peat*

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1. *Peat Ashes*, from Newbury, Berks. Of these ashes I have spread, in various quantities, per acre, fifteen hundred bushels, on wheat, tares, feeds, and meadow land, without being able to discern any beneficial effect from them.

2. *Coal Ashes*, spread on three or four acres of grass land, in March, 1798, produced no visible effect at *mowing time*, nor have I *since* observed any.

3. *Wood Ashes*, the produce of my own fires, when spread on the grass in February, or early in March, I have found to be of some, though little service.

4. *Malt Dust*, including the dust from the malt-kilns, I used for two or three years, to an extent sufficiently great to ascertain that the benefits produced by the use of it are considerable. It may be applied in such a quantity as to insure *one large crop*; but on meadow land, even when hay is at five pounds a ton, it only repays the prime cost.

The quantity which I have usually laid on, has been in the proportion of from fifty
to

to sixty bushels per acre. The first cost of kiln-duft is six-pence, and of malt-duft eight-pence per bushel: including the expence of carriage, and spreading this dressing on the land, it amounts to about two guineas per acre. The extra crop returned me this sum, but without profit.

5. *Soot.* Of this Manure I spread eight hundred bushels over twenty acres of wheat in one year; but I could not, from the subsequent appearance of the crop, discover whether the increase in quantity was equivalent to the additional expence. However, it was evidently of some use; but to what extent, would require more than bare inspection to ascertain. By way of comparison, some of the ridges were left without soot; they were at harvest scarcely to be distinguished from the rest; but where the soot lay in larger quantity than ordinary, as was the case in the places at which the loads had been shot from the carts, the superior vegetation was very distinctly marked. I have, on the whole, formed the same opinion

nion with respect to this species of Manure, as I have already stated in regard to malt-dust, namely, that it returns the cost price, with very little profit.

6. *Soap-maker's Waste.* I have tried only one load of this Manure on a few rods of ground, in four of my meadows. It has not produced the least effect, although it is now three years since it was laid on. Soap-maker's waste, Pot-ash, and Barilla, are probably held in too much esteem, as preparers of the food of plants, by philosophical chemists, of whom it might be wished that a little *practice* were combined with their *theoretical* ideas on the science of Agriculture, that they would try their specious theories by the test of experiment, before they publish them to the world.

I am further induced to consider this kind of dressing for land, as of much less utility than is generally imagined, from having been informed by Mr. Ruffel, jun. that his father, who is a Soap-maker of great respectability at Paris Garden, has used the waste

waste of his own manufactory on his farms in Essex and Kent (in the latter on a clay soil), without discovering that it was of any material benefit to the land; and that he has consequently discontinued the use of it.

The experiments made by Major Valley, as reported in the Eighth Volume of Papers published by the Bath Society of Agriculture, seem also to prove that Dr. Hunter's food of plants does not answer *any* of the purposes for which it has been so highly extolled; but, on the contrary, that it is really *hurtful* to corn crops.

7. *Sweepings of London Streets.* I have used several hundred loads of this manure on grass land, and have found it to be of considerable service to the succeeding crops. I have usually laid it in large heaps, and mixed with it a small quantity of horse dung: in this state it generates a little heat, though less than might be wished, which helps to decompose or rot the mixture; when thus prepared, it has been spread on
the

the land, in the proportion of ten or twelve loads per acre.

8. *The Soil of Privies.* Within the last four or five years this Manure has been spread on my land, to the expence of about £.100; the proportion, from two to four loads per acre. The effect produced by it was *astomishing fertility*; so much so, as to induce me to be of opinion that it exceeds every other kind of Manure that can be brought into competition with it, at least for the *first year* after it is laid on. In the second, it is of some service; but in the third year its effects very nearly or entirely cease. From these premises I draw this conclusion, that, for land in good condition, the application of two loads per acre, per annum, will continue it in that state for any length of time: and also, that land which has been much exhausted might be restored by laying on four or five loads per acre; after which a repetition of two loads annually would be found sufficient to keep it in the highest degree of fertility.

9. *Farm*

9. *Farm-yard Dung.* This, when it had been once turned and become about three-fourths rotten, I have used in the proportion of about *thirteen* or *fourteen loads* per acre, and found it much less effective for *one* year than *three loads* of night-soil. I believe that even a load and a half of soil would have been equal to the foregoing quantity of dung. In the *second* year I could not perceive any difference between the dung and the soil.

In the last Volume of the Transactions of the Society, page 168, a crop of wheat, amounting to 56 bushels per acre, is said to have been raised by Mr. Henry Harper, of Lancashire; which is so much above the general average, that Mr. Harper was at a loss how to account for it. I am inclined to think that the *Night-soil* contained in the mixture with which he dressed the close, was the cause of this *wonderful effect*.

He mentions, that the quantity of Manure (consisting of *Night-soil*, Coal-ashes, Sweepings of Streets, &c.) was eighty tons,
and

and that the clofe contains eleven acres: the proportion per acre was therefore something more than seven tons. He does not fay what part of this proportion was Night-soil, but it was probably not lefs than four tons; a quantity which, as I have before obferved, is fufficient of itfelf to produce one immense crop.

In fhort, it appears to me that nature, following her general fyftem of re-production, prepares this matter in the moft perfect manner for the purpofe of feeding vegetables, and raifing them to the very higheft pitch of excellence: and it is certain, that herbage growing under thefe circumftances is capable of fattening the *largest* cattle in lefs time than any other.

The importance of this kind of Manure being fo evident, I am fure the Society will feel, equally with me, the moft poignant regret, when they take into their confideration that ninety-nine parts in every hundred of this valuable article is constantly and moft *abfurdly* carried, by the fewers and drains,

drains, into the rivers, and thereby totally lost to the purposes of Agriculture, for which it is so admirably adapted.

In Britain alone the quantity of this Manure, and of urine, which is annually thus wasted, is astonishingly great ; probably not less than five millions of cart-loads, worth to the farmers two millions and a half, and to the community five millions of pounds sterling per annum.

This subject is, I think, well entitled to the attention of the Society ; and it would add much to the credit which they have already acquired by their patriotic labours, if they could devise the means whereby the waste of this article might be effectually prevented.

I am, SIR,

Your very humble servant,

JOHN MIDDLETON.

Lambeth, 28th Nov. 1798.

MR. MORE.

The

The GOLD MEDAL, or the SILVER MEDAL and TEN GUINEAS, at the option of the Candidate, was this Session adjudged to MATTHEW FORSTER, Esq. from whom the following Papers were received, and who made choice of the GOLD MEDAL.

SIR,

I BEG leave to offer my experiments and observations to the Society for Encouragement of Arts, Manufactures, and Commerce, for the premium of the comparative culture of Turneps, Class 90, having for many years paid much attention to Agriculture (particularly Turnep culture), and for fourteen years past have cultivated between thirty and forty acres annually, and tried many different methods of culture on that useful root. I hope the Society will excuse any inaccuracy and provincial words made use of in my Papers.

I am,

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I am, with the utmost respect, wishing
prosperity to the Society's improvements of
the chief of Arts,

Your humble Servant,

THE CANDIDATE.

Mr. MORE.

*An Account of the Experiments made on a
twenty-one acre Field of light sandy loam,
from four to six inches deep, on a sandy
substratum, to determine the comparative
advantage of the Drill or Broad-cast me-
thod in the cultivation of Turneps.*

IN December, 1797, the field, being oat
stubble, was ploughed with a deep furrow ;
in the latter part of April, 1798, it was har-
rowed with four harrows of different lengths
of tines or teeth (from ten to six inches be-
low the wood), giving the field four dou-
bles. A week after, a light weed-harrow
went over the field, and collected the weeds

R into

into rows, which were carted off into a heap to make compost. In May the field was cross-ploughed, with the same harrowing as above. In June the field was three times ploughed and harrowed as before, and twenty women hand-gathered the weeds, which were carted off to the compost heap.

The manure was carted from the fold-yards and stable dunghills into a pond, made on purpose to contain the fold-yard water, and the whole surface covered over with soil to prevent the fermentation from escaping, and assisting in destroying the seed of weeds going out with the manure. Twenty cart-loads (each short cart containing thirty-two Winchester bushels) were laid upon each acre: the manure was spread upon the field, and we began to sow the 21st of June: the seed was round white, with a small mixture of red seed.

For many years past I have always sown my turneps with a simple machine that fixes to the plough, and sows the seed in
the

the seam or hollow between the furrows ; and a small harrow fixed to the machine, harrows in the seed ; and a plough without a machine to follow every plough with the machine, to make the distance two feet between the drills : if more distance is wanted between the drills, two ploughs may follow the machine plough, and make the distance three feet between the drills. The quantity of seed sown is one pound per acre. I have observed from experience that thick sowing is a protection against drought, and the plants will grow more in one week, than thin-sown plants will do in two, as long as the plants have their nourishment from the seed, after which it is proper to hoe the first time.

From the 21st to the 28th of June, thirteen acres were sown on two-foot drills. On the 28th eight acres were sown ; viz : four acres and a half drilled at eighteen inches ; three acres and a half sown broadcast, and rolled the same day, which I always practise on dry land, as it keeps the

drought out and retains the moisture; except the land be wet, then roll when the land is dry. Before hoeing I have a plough without any mould-board, two inches broad at bottom, and a share with two wings set to the angle of forty-five degrees, broader or narrower as the drills are in breadth, to hoe between the drills. A man with one horse will hoe three acres per day; the hand-hoers immediately follow. The first time hoeing costs 5s. 4d. per acre: after the weeds are dead, the above plough is run through between the drills a second time, and the second hoeing follows, which costs 2s. 8d. per acre (hoed to one foot distance). After the weeds are dead, a double mould-board plough, with a man and one horse are employed to earth up the soil close about the turneps, so as not to cover the tops, which preserves the turneps from frosts much better than those sown on the top of drills.

Feb. 28th, 1799. The fortieth part of an acre drilled at two feet distance, the
same

same quantity on the eighteen inches drilled, the same quantity on the broad-cast, were accurately set out by a neighbouring gentleman; the turneps drawn, and tops and roots cut off; and they were separately weighed in the presence of a magistrate, the curate of the parish, and several gentlemen; and the produce was as follows:

One hundred and twenty-one square yards, drilled	lb.
at two feet distance, weighed	1438
One hundred and twenty-one square yards, drilled	
at eighteen inches distance, weighed	8:7 $\frac{1}{2}$
One hundred and twenty-one square yards, broad-cast, weighed	667 $\frac{1}{2}$

These quantities were taken from the middle of the field, where there was no perceivable difference. The broad-cast was hoed to the same distance as the others, and as full stocked with plants, and as regular as the others, but smaller in size, the whole field being clear from weeds.

The great storm of snow prevented me from weighing sooner, and the frost had spoiled part of them. I think if the same quantity had been weighed at the latter end

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of November, 1798, they would have weighed one third more at least. In my opinion the air confined between the drills after the tops meet, greatly assists the growth of the turneps, much more than in the broad-cast way.

The two-feet drills are much the best all over the field: I have two other fields of turneps, one six acres, four of which were sown broad-cast; the other field eight acres, drilled: the drilled in both fields are double the quantity of the others.

The above comparative experiments are in my mind clearly decisive in favour of drilling, as dry land suits the broad-cast method; for in heavy moist soils, or thin or weak soils, the broad-cast is not worth cultivating.

REMARKS ON THE CULTIVATION OF TURNEPS.

The most useful Soil for Turneps.

Rich loams, gravelly loams, sandy loams,
clayey loams, limestone gravel, whin gravel.

Inferior

Inferior Soils for Turneps.

Chalkey soils, gravelly soils, hazel soils. These must be effectually under-drained; if not, they are not worth cultivating for Turneps.

Turneps ought never to be sown upon strong retentive clay soils, thin yellow sandy soils, or thin white sandy soils.

Preparing the before-mentioned Soils for Turneps.

The number of ploughings must be regulated according to the foulness of root-weeds, and tenacity of the soil, which must always be made as clean from weeds as possible, and as much pulverized as the nature of the soil will admit (as turnep-feed requires as fine soil as any garden seed). As to cleaning the land, every agriculturist is informed in what manner to perform that; as to plough the land, and roll stiff clotty soils frequently after harrowing is the best method I know of both in assisting to pulverize, and to get out the root-weeds.

Manures.

The fold-yard and stable dung carted out into a proper place and covered over with soil, and turned after having laid a month or more, makes the best manure for Turneps I know of. I have, for many years, had good crops of Turneps by laying composts of soil and lime (in my using peat or black earth) upon sandy or gravelly soils, sixty cart-loads or more upon an acre. Lime is very little known as to the good qualities it produces as a manure; the smallness of the quantity laid upon an acre (as far as my observation has reached) has no more effect than if one cart-load of rotten dung was regularly spread upon an acre, owing to the different quality of lime. The richness of some lime has $\frac{1}{12}$ of calcareous earth in a cart-load; in other lime $\frac{1}{12}$ of sand in a cart-load. What effect can two cart-loads of the latter, containing thirty-two Winchester bushels per load have as a manure upon one acre? It would require

quire ten cart-loads of the latter to be laid upon an acre, to be equal to the former ; the expence of which would be more than the value of an acre of good turneps. I have seen very good crops of turneps where three cart-loads of the former lime was laid upon an acre without any other manure. Such lime, where it can be had at a moderate expence, is a rich manure, and is found to be a great improvement when the land is laid down to grafs. As for the other manures, such as night-soil, soap ashes, &c. &c. these are local manures, and can be only had in quantities in large towns, &c. which only answers for individuals.

Sowing Turneps.

The best kind of turnep-seed I know of is the round white green top, and red for field turneps. If turneps are wanted to feed down early in autumn, begin to sow about the 1st of June (if sown sooner, they run to seed before Martinmas), and continue sowing

sowing till the 12th of July: later sowing seldom gets to a size worth standing. One pound of well dressed seed is the quantity I always sow upon an acre, both for drill and broad-cast. The proper depth is two inches; if less covered, they are injured by drought, or washed bare with rain. The best prevention against the fly is thick sowing and rolling early in the morning. I have always observed the rolled turneps improve much more than those parts of the field which were not rolled. As to horse-hoeing and hand-hoeing, I refer to the method used in the twenty-one acre field above. In my opinion, the best distance for drilling is *two feet*: if large turneps are wanted, two feet six inches, up to three feet: less than eighteen inches cannot be properly horse-hoed, which is material to the growth of the turneps, as well as making a good clean fallow of the field.

Method

Method of Drilling.

A double mould-board plough should go over the field, to form the soil into drills; the manure should be immediately carted into the drills, and laid down in heaps, in the middle of each five drills, and women set to spread the manure with their hands, which they will do more regularly than men with forks, and with less cost. As to level-drilling, I again refer to the twenty-one-acre field method.

Comparative advantage between Drill and Broad-cast.

The advantage of drilling on good land is obvious, as the horse-hoeing and hand-hoeing greatly assist the growth of of turneps; and when the tops meet from drill to drill, the air contained under the tops greatly assists the increasing size of the turneps.

Of Drilling on inferior Soils.

The advantage in inferior soils, in my opinion, is so great, that forty years ago no
turneps

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turneps were ever attempted to be grown on any such soils, when broad-cast was the only method of cultivating turneps ; at any rate a barbarous practice upon such soils, and which ought entirely to be exploded, except in burnbating, provincially in this district called paring and burning. In drilling the above soils, raised drills in thin weak soils nearly double the thickness of the soil ; and in moist soils the land is kept in a dry state, and the turnep-seed sown as on a hot-bed. Besides the great advantage of horse-hoeing, from the long experience I have had in the cultivation of Turneps, I am entirely in favour of drilling.

To preserve Turneps for late Spring-feeding.

I have tried many different methods, viz. storing them up in a house, stacking them with straw after the tops and roots were cut off ; digging holes in sand, and covering them over ; ploughing a furrow in the stubble, and laying them in it by the heels,
and

and then ploughing another furrow upon them. The great expence and rotting of the turneps, made me give up the above methods; and after trying several more, none of them answered. I tried to stop the vegetation of the seed-stem; and in the middle of March, three years ago, I set two women with large knives to cut the tops of the turneps very close, each woman cutting two rows at a time, going in the middle of two rows, and cutting the tops off right and left. On that day they cut one acre, which cost 1s. 4d; the tops were laid in heaps, and carried off in baskets, and given to the sheep in the fold. The experiment answered above my expectation; the turneps were preserved three weeks before they put out for seed-stems, which was round about where the top was cut off, and the turneps kept sound. One night's frost will destroy these tender shoots, and then they will have to make new ones again. I have continued this practice ever since, and have preserved turneps to the
middle

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middle of May; when the sheep never eat any of the turneps that were not cut, and very little of the stem in flower.

The foil where the turneps are cut is very little exhausted by the roots of the turneps, which have no seed-stem to support.

The foil is very much exhausted where the seed-stem is suffered to flower, which is chiefly supported from the foil.

S I R,

WE whose names are hereunto subscribed, do certify, that on the 28th day of February last, on the farm of Mr. M. Forster, at Broomy Holme, in the parish of Chester-le-street, in the county of Durham, we viewed a crop of Turneps of twenty-one acres, or thereabouts, and that, from the same indifferently chosen, we measured off three equal portions, consisting of four perches each; namely,

Four drilled at two feet distance,

Four drilled at eighteen inches,

Four broad-cast.

And

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And after the roots and tops of the turneps were taken off, and cleaned, the produce of each portion, as above specified, weighed as follows :

		Weight per acre.			
	lb.	Ton.	cwt.	qr.	lb.
Quantity drilled at 2 feet,	1438	25	13	2	8
Ditto ditto 18 inch,	827 $\frac{1}{2}$	14	15	2	4
Ditto, broad-caft	667 $\frac{1}{2}$	11	18	1	16

Witness our hands, this 9th day of March, 1799, at Chester-le-street.

WILLIAM NESFIELD, one of his Majesty's Justices of the Peace for the County of Durham.

ROBERT NELSON, Sub-Curate of Chester-le-street.

WILLIAM FEATHERSTONHAUGH.

GEORGE WARDELL.

Durham, April 5, 1799.

Mr. MORE.

In

In consequence of the following Papers, the SILVER MEDAL was this Session voted to the Rev. HENRY JEROME DE SALIS, D. D. the Candidate being precluded obtaining the GOLD MEDAL, which was the Premium offered for the CULTIVATION of PARSNEPS, for the purpose of feeding Cattle and Sheep, by the conditions required by the Advertisement having not been fully complied with, owing in some degree to the inclemency of the Season.

S I R,

I HAVE hitherto delayed my promised letter to you, upon the subject of my Parsneps, in the hope that I might be able, at one and the same time, to give you an account both of the quantity of land on which I have cultivated them, and of the amount and application of the produce. The frost, however, has prevented me from taking up the roots upon more than
four

four acres out of six, that I appropriated to parsneps. These four acres are a strong argillaceous loam, which from the beginning of the autumnal rains was not in a condition to bear carting. I have the satisfaction however to know that the frost, though very severe in this place, has not hurt the roots; so that I have them in reserve for my fattening sheep, and ewes, and lambs, at the return of the open weather. The two acres and a fraction were of a sandy loam: the crop on this land, owing to the great drought in the spring, was a very short one. Of the application of that, however, I am able to speak in part: a very fine Yorkshire short-horned heifer was stalled, quite lean, and fed from the beginning with parsneps and very fine clover hay. It was ten weeks last Saturday, (the 2d of February) that she was put up: she took to them immediately, and for the first fortnight ate about sixty pounds per day, together with a considerable quantity of clover hay. I then increased her quantity of parsneps to about one hundred pounds daily: since that increase, she has not eaten more

S

than

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than five or six pounds of hay, and she has drunk much less. What she has continued to drink in the day is about four gallons. She is tended by a very careful and experienced feeder, who told me at the end of the first week, that she began to thrive; and he has ever since continued to say, that in all his experience he never saw such improvement as this food has made on her. Some of the first graziers of this country, perfectly skilled in the effects of oil-cake, have separately seen her, and told me afterwards that oil-cake could produce no such effect. She will be completely fat by Easter; and if she is, the proposition of the Jersey Board of Agriculture, that a beast from quite lean will be rendered quite fat by parsneps in three months, will, in this instance, be nearly verified. Indeed, if she was to be killed now, it would be verified; for she is now fat.

I am, SIR,

Your obedient servant,

H. J. DE SALIS.

*Wing, near Leighton Buzzard,
Feb, 8th, 1799.*

Mr. MORE.

S I R,

THE land upon which the parsneps were cultivated, has been accurately measured by a regular land-surveyor, Mr. Long, of Fenny Stratford; and four acres and a fraction of it, which is in this parish, were also measured with the rest of the parish, by the surveyors appointed for the late inclosure. I am ignorant of the forms required by the Society, to be observed upon these occasions; but as the paper which you gave me in June last states, that Certificates should be given in on the second Tuesday in February, 1799, it is now rendered impossible by the weather, and the extreme badness and danger of the roads, from observing that condition.

To the account given to you in my last letter, of my Yorkshire short-horned heifer, which has had parsneps only, with a little clover hay for her food, I am now able to add, that a butcher whose judgment is acknowledged throughout the country, has

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this morning pronounced the heifer completely fat; so that the proposition of the Jersey Board of Agriculture, to which I alluded, and which may be seen in the Volume of communications of our Board of Agriculture, viz. that a beast from quite lean will become quite fat at the end of three months, if fed with parsneps and hay, is completely verified.

I am, SIR,

Your most obedient Servant.

H. J. DE SALIS.

Wing, Feb. 11, 1799.

Mr. MORE.

S I R,

AGREEABLY to my promise, I now inform you, that fifty fatting wethers, which had been disappointed of their turneps by the severity of the frost, have been
been

been regularly served with parsneps, to the amount, upon an average, of 420lb. a day, during seventeen days, including this. They immediately all but two took to them; and one of the two had a sore mouth, which disabled him from eating any but the softest meat. At first, however, the greatest part of them ate this new food with diffidence, whilst some of them, from the beginning, shewed a decided taste for it. By degrees they all acquired the same taste, and they now all of them shew the most marked impatience for their times of being served. They feed greedily, but appear to be soon satiated. In the mean time, they are visibly improving, and there is no doubt of their being soon ready for the market. Should any thing worth your attention occur during their progress, you shall hear farther from me.

The cow will be killed in the course of this, or in the beginning of next week. She has improved very much since the time of my last writing to you, and is now of

the degree of fatness expected in our markets a little before Easter. The only circumstance relating to her that has occurred since I last wrote is, her having eaten more parsneps and less hay, since she has been regularly served with the roots fresh from the ground. I believe I mentioned to you before, that for some time she did not eat the quantity of parsneps she had done, but that she ate more hay. The parsneps with which she was then served, had been dug up soon after Michaelmas.

I am, SIR,

Your obedient Servant,

H. J. DE SALIS,

Wing, March, 10, 1799.

MR. MORE.

The

The Thanks of the Society were this Session voted to THOMAS SKIP DYOT BUCKNALL, Esq. for the following Communication relative to the Cause of BLIGHT ON FRUIT-TREES, and which may not improperly be considered as a supplementary Paper to the Letters on Orcharding by that Gentleman, already inserted in several Volumes of the Society's Transactions.

SIR,

I BEG you to present my compliments to the Society for the Encouragement of Arts, Manufactures, and Commerce; and acquaint them, that to gain information on the cause of decay in engrafted fruits, and make the system of Orcharding which they have patronized and honoured by publishing in their Transactions, Volumes 11th, 12th, 13th, and 14th, as perfect as is in my power, I spent the
month

month of September 1797, in Gloucestershire, had much conversation with persons the best informed on the subject of fruits, and found it a general regret, that the *valuable old varieties* of cider-fruits are mostly gone. The *Stire* is in the last stage of decay; yet, from the appearance of those trees now totally worn out, they must have been, in their meridian health, *Noble-trees*. The *Redstreak* is nearly gone, and there are many well-grounded fears entertained for the *Golden Pippin*. The *Fox-whelp* still remains in full bearing, with many other of the valuable varieties in different stages of health.

This information, collected on the spot, it is requested the fruit-growers will attend to; for I am persuaded, had my system of orcharding been introduced fifty years ago, many of the lost varieties might have been now in health: and by attending to that system, those still remaining may be retained much longer than in a state of unassisted nature. In my first paper I strongly recommended

commended to the planters to choofe the forts which thrive in the neighbourhood, or are in health and full bearing in the country from whence they are to be brought; and from further experience I more clearly fee the neceffity of this injunction.

Shakespeare fays, “There is a tide in the affairs of men;” may I apply the thought to fruits? There appears at prefent a crisis in the ftate of Apples; all the varieties of the Ruffets and Pearmains, with many others, are wonderfully going off. In a former paper I mentioned the Maidftone diftrict as abounding in valuable fruits; they have materially failed from blight during the laft three years. Several of the neighbours in Eaft Farleigh took me to examine the refpective plantations, and pointed out one orchard of about three acres, which produced the moft beautiful crop; a finer parcel of fruit could not have been fhewn. We each concurred in the caufe; it is explained in the Orchardift, and would be repetition here, *actual health arifing from fhelter, and cattle paffing over the ground.*
During

During the many years I was engaged in forming the Orchardist, I would not suffer a word to be taken from a book, for copyists are apt to mistake : all my observations are drawn from nature. But now I cannot expatiate on the system of the old varieties, better than is done by Marshall, an author of deserved repute, who, in his Rural Economy of Gloucestershire, published in 1789, Volume II. page 239, remarks : “ Engrafted fruits are not permanent, they continue but for a time.”

T. A. Knight, Esq. in his Treatise “ On the culture of the Apple and Pear,” has shewn a wonderful and truly scientific regard for the recovery of the valuable old varieties, &c. and is now rationally attempting to produce new varieties, equal or superior to those we regret the loss of ; and for the benefit of the world, I take the liberty of introducing an extract from a treatise he has published at Ludlow.

In page 6 he says : “ The apple is not the natural product of any soil or climate, but owes its existence to human art and industry

industry. The first varieties were no doubt introduced from the Continent: the continuance of every variety appears to be confined to a certain period, during the early part of which *only* it can be propagated with advantage to the planter."

Mr. Knight, with a view to secure some new valuable varieties, says in his excellent work, "I prepared stocks of the best kind of apple I knew, and planted six against a south wall, in extremely rich mould."

Thus far Mr. Knight, through the whole of whose treatise there is much information. I allow that these six trees are the most beautiful both in stem and leaf I ever saw; and am ready to confirm the opinion, that they promise success: the sorts are, the *Golden-pippin*, *Forest-fire*, the *small rich Marden apple*, a very rich astringent yellow (but not acid) crab, and the yellow Siberia crab. These trees are planted to grow free and fine, that the fruit may be in the highest perfection, to produce valuable seed for raising new varieties; and the blossoms were
regularly

regularly crossed according to the sexual system of plants, with the same attention as a nobleman would give to improve his breed of brood mares and colts, choosing the best qualities in each, as far as nature will admit. As varieties are terms hardly thought of out of the cider countries, and little understood there, I beg indulgence farther to elucidate them as follows: Secure a new valuable kernel fruit, and from that engraft as best suits your sentiment. Allow me to call the first tree primogeneous, or *stock*: all the grafts taken from this, or any of the descendants, will, for some generations, thrive; but when this *first stock* shall, by mere dint of old-age, fall into actual decay, a nihility of vegetation,—the descendants, however young, or in whatever situation they may be, will gradually decline; and from that time it would become imprudent in point of profit to attempt propagating that variety from any of them. This is the dogma which must be received: I do not expect a direct assent, neither do I
 wish

wish it, for it should be taken with much reserve. I only hope that I have fully explained the system: it is a received opinion that a variety of apple may, according to its hardiness, continue from one to two hundred years, the pear longer. My friend Mr. Knight allows care and attention may preserve a tree perhaps half as long again, as when left to unassisted nature. Grant me this, and I ask no more: let those who doubt make the actual experiment, and the very attempt will carry conviction.

To those unacquainted with the term *variety* as applied to orcharding, I cannot define or explain it better than a valuable new apple raised from seed pip, or kernel, which has been fortunately preserved by the distinction of the planter, and selected by him from some good appearance in the leaves, free growth of the wood, or beauty and straightness of the stem. Such a tree out of the cider countries is termed kernel fruit, that is, an unengrafted tree; and the apple commonly takes its name from colour

colour or some inherent quality, as golden-pippin, ruffet, cat's-head, &c.; or from the place where it was raised, as Farleigh pippin, New-Town pippin, Court of Wick pippin. This last is mentioned by Mr. Billingsley, in the Somerset Report, page 124, as a new variety, and a favourite apple. In that neighbourhood, he says, "it originated from the pip of the golden pippin, and may be considered as a beautiful variety of that fruit. In colour and flavour it has not its superior. The tree is large, handsome, spreading, and a luxuriant bearer, and on the whole cannot be too strongly recommended." The apple I saw at the Board of Agriculture, but then it was decayed by being over-kept. His Excellency Rufus King sent me a present of the New-Town pippin, and what he called the Greening. I wanted the New-Town pippin for the kernels; but when the fruit was cut, it was obvious, from the size of the pips, that the fruit had been gathered long before it was ripe, the better to convey

vey it by sea from America. It does not seem to suit our climate as yet, except in warm situations, though I have heard it highly praised by the Americans. Miller remarks, a little proper attention will naturalize many foreign plants. I am sure it is wonderful how many different species of plants have been naturalized within my time. The most effectual way of doing it, is to keep the plants in health, and harden them by degrees.

Mr. Knight's system and mine are in unison. He, as it were, attempts to create; I, to preserve. Consider, what do I recommend? To secure shelter—destroy the moths—heal the wounds—check the baneful effects of canker—stop the oozing of gum; and by manuring the land, pruning and washing the tree, make it healthy, if it is not so old as to have lost the energy of growth. Fruit-trees may bear for years after growth has become almost stagnant; then the knife can do but little, nay, would be mischievous, if it lets in the cold winds. Medicine may keep a palsied man alive, but

but nothing in the healing art will make him young : therefore, what is attempted by way of science, should be begun in the early stages of the plantation, and so go on to the extreme of old-age.

Those the least conversant with vegetation know that the operations are nearly uniform. This induces me to mention, that in Hampton-Court Gardens there is a vine of the Black Hamburgh, which fills a house 72 feet long, and 18 feet over, making an area of 1300 feet superficial of glass, under which there are more than 1800 bunches of grapes, all from one stem ; and what is worthy observation, the branches farthest from the root produce the largest and clearest fruit. This vine is every year productive, merely from pruning, washing, and cleaning. The bunches are in the spring as regularly set out, and with as much attention, as the turnep-hoer sets out his field crop. An incumbered tree never can attain its full size, or be in health ; for when the free circulation of the sap is checked,

checked, the tree becomes diseased, and most of the inward branches are torpid or rotten : in this state there remains no remedy but cutting them out. Now consider what a misfortune in orcharding to have the powers of vegetation so lost, which properly directed would have kept the tree in health. My intention in introducing the vine here, is to *aver*, that to whatever size nature can carry a fruit-tree by the assistance of pruning, washing, care, and shelter, such tree is capable of growing much larger, and from that must of course acquire better health. May I say, growth and health are almost synonymous ? for, where there is a freedom of growth, such tree is little affected with canker or gum ; neither would it be so much injured by insects, who, by preying on the leaves and blossoms in the spring, are now known to be a material cause of blight. I wish to enforce that actual health would in some measure prevent blight.

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There are many letters in my possession corroborating the opinions above advanced respecting the preservation of Fruit-trees, which will be published when these papers are collected.

Blight.

It should be understood from the Orchardist, that each step regularly tending towards bringing the tree into health, must be so far operative in preventing blight. Let us attempt to ascertain from what blight arises: I should suppose that whatever has a tendency to prevent the due impregnation of the blossoms, or injure the foliage of the tree, will in a certain degree cause blight. The farmers say my trees are blighted, and some of them imagine the insects are brought over in thick hazy clouds: be assured the flies, grubs, moths, insects, &c. do not come over in the winds from the Continent, but are bred at home from the eggs being deposited about the tree in summer and autumn. And respecting

ing cold, it is not so much the intense cold which does the mischief, as an alternate succession from heat to cold : for when the sun has rarified and expanded the air within the air-vessels, then the succession of frosty nights, heavy rains, cold winds, with snow or fleet after a warm day, greatly tend to check the growth of the tree ; and from the preceding warmth, these causes have more power to destroy the delicate formation and expansion of an infantine vegetation, and prevent a due impregnation of the blossom without which there can be no fruit. Cold under-water, or land springs, stunt the tree, and cause blight. Long drought, with drying winds, injure the farina, so that it imperfectly performs the office nature has designed it for. Other causes may predispose the tree to blight, as an overabundant crop the preceding year, which so exhausts the vital principle, that the tree has not sufficient strength to mature the fruit, and fill the bearing buds for the next spring : a want of free circulation of air causes blight.

Under any of the foregoing statements, should the trees be old, in a declining state of health, or the branches covered with rotten bark, moss, &c. under which insects may have deposited their eggs; the eggs may also be within the buds, or worked round in ringlets on the last year's shoots. I say, let the eggs be where they may, *swarms of depredators* will certainly issue to destroy the weakly foliage. On the contrary, where the trees are clean, and in health, insects are not so numerous, neither are they capable of being so destructive; for should they devour part of the opening buds and leaves, a healthy tree will have sufficient strength remaining to produce a slight crop of fruit. Young stock poorly kept through the winter, in a straw yard, shall be covered with vermin; when the stock are turned into good pasture, and acquire health, the vermin drop off; not that they are tired with their situation, but the health of the creature will not allow them to continue any longer there. Similar

lar circumstances are known to attend the trees.

Observe, when rational means are made use of to give energy of growth to standard fruit-trees; should the tree acquire the growth, the rotten bark, moss, &c. shall from that time gradually fall off, just as the vermin drop from the cattle. These are known facts, and easily tried: to account for them, say, the cattle and trees are only getting into better health; this is the governing principle in both cases. As one means of establishing health in old trees, I recommended rubbing them over with oil: Mr. Fairman, has for some time used oil to good effect; and I should now say, mix a little sulphur or tobacco-dust with the oil, to give it the consistence of thin paint, which would have a tendency to offend the insects, and drive them from the trees. It is observable, these little creatures are particularly delicate and careful in choosing proper places to deposit their eggs, and secure such a nidus as may be fitting for the preservation of their future progeny.

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I, seven years ago, bought, by way of experiment, a handsome young tree, of the old varieties, the Nonfuch ; and planted it in a proper situation, saying it should not canker. The tree is now as clean and perfect as possible, merely from pruning and washing with soap-suds, and not permitting much fruit to grow, thinking it prudent first to form the tree before we expect the fruit.

I mentioned sulphur or tobacco-dust ; but there are many cheap drugs, which could be easily applied to this purpose, particularly the bitter aloes. If those concerned would only order one large old detached tree to be made perfectly clean, it may be soon proved whether the idea will answer ; at the same time a good coat of manure should be thrown over the ground as far as the roots extend.

No mischief arises to fruit-trees until the warm weather commences, because, before that period, insects are not hatched ; but the same degree of heat, which will cause
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the sap to flow through the branches, and set the roots to work, is sufficient to hatch many of the insect tribe: others come out afterwards, and continue till near Midsummer, by which the foliage is mostly eaten up. From this the planter runs a hazard for the next year, as there is hardly time from Midsummer for the tree so to recover as to fill the bearing buds, to produce a crop. I hope, with the aid of a little consideration, I have nearly proved that the insects for the most part produce the mischief.

I remain, SIR, with many good wishes
for the continued prosperity of the
Society,

Your most obedient servant,

THOMAS SKIP DYOT BUCKNALL.

Hampton Court, Nov. 30, 1798.

MR. MORE.